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Field Observations on the Spread of Fowl Paralysis by Eggs and Young Chicks.

BY

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The clinical features, gross and microscopic pathology of fowl paralysis have already been described by Marek (1907), Kaup (1921), Doyle (1926, 1928), Dobberstein and Haupt (1927), Thomas (1928), Pappenheimer, Dunn and Cone (1929), McGaughey and Downie (1930).

It has recently been recognised that this disease is more prevalent in England than was previously suspected and its further spread appears probable. Information is accumulating which points strongly to the conclusion that the disease is transmitted through the egg and that young chicks may be infected when hatched, although normal in appearance. As the time required for the development of clinical signs appears to be from several weeks to several months, under natural conditions, the obvious infection of a flock will not be noticed until the birds are partly or even fully grown. The information leading to this conclusion is derived from two sources (*a*) experimental observations, under controlled conditions, of chicks hatched from eggs obtained from infected flocks and (*b*) observations in the field. This note is based on data gathered from seventeen outbreaks on poultry farms.

Doyle (1928) has already brought forward evidence from experimental breeding. He states: "We have reproduced the disease by merely breeding from an experimental flock in which there were cases of paralysis and in which there were cases of iritis. Several of the birds hatched from eggs laid by the affected flock developed typical paralysis with well-marked neuritis and myelitis before they were two months of age. One bird developed the disease at 47 days of age. Control birds from a flock in which the disease was never known to have occurred have shown evidence of neuritis or paralysis during a period of six months."

McGaughey and Downie (1930) mentioned that there was some evidence that the disease had spread from an infected flock to two fresh premises through eggs bought from an infected place. McGaughey (1930) suggested the adoption by poultry breeders of the following measures:—

(*a*) The purchase of eggs, chicks and older birds only from flocks free from all suspicion of the disease.

(b) The segregation of adult breeding stock on uncontaminated ground and prevention of contact with young birds.

Since the earlier investigation, fifteen further outbreaks have been studied. In nine instances there is strong evidence that the infection was introduced through eggs; in six by young chicks. In some instances the eggs were known to have come from an infected flock; in others, two or more outbreaks were traced to eggs or young chicks bought from the same dealer. The owners of the premises on which these outbreaks occurred state that they had been free from the disease in previous years. In the majority of cases, birds bred from the owner's own stock or from other healthy flocks remained unaffected or developed the infection only after prolonged contact with diseased birds.

We do not intend to imply that this mode of spread is the only possible one, but desire to point out its importance. It would appear that the principal method of spread is through breeding from affected adult birds. Although spread by contact occurs, the process appears to be slow and somewhat uncertain. We have observed instances in which pullets became noticeably diseased within a few weeks after they had been bought and the disease remained localised to one lot of birds.

The following notes summarise the information obtained from seventeen outbreaks.

Outbreak 1.—Disease appeared first in birds hatched from eggs obtained from a flock where fowl paralysis is known to exist. A few birds from owner's own stock developed the disease later.

Outbreak 2.—Disease appeared only in birds hatched from eggs obtained from same premises as in (1). Birds from own stock remained healthy.

Outbreak 3.—Disease appeared only in birds hatched from eggs obtained from another flock.

Outbreak 4.—Disease appeared first in White Wyandotte pullets hatched from eggs bought from dealer "X." Later it spread to Leghorns bred from own stock (*c.f.* outbreak 5).

Outbreak 5.—Disease first appeared in Leghorns hatched from eggs bought from dealer "X."

Outbreak 6.—Disease appeared in birds hatched from eggs bought from dealer "E" (*c.f.* outbreaks 7 and 8).

Outbreak 7.—Disease first appeared in birds hatched from eggs bought from dealer "F." Birds from own stock remained healthy.

Outbreak 8.—Disease appeared first in birds hatched from eggs bought from dealer "F." Birds from own stock became affected later.

Outbreak 9.—Disease appeared only in birds hatched from eggs bought from dealer "F". Birds from own stock remained healthy (*c.f.* outbreak 11).

Outbreak 10.—Disease appeared first in birds hatched from eggs bought from another flock. Birds from own stock became affected later.

Outbreak 11.—Disease appeared in birds bought as chicks from dealer "F." Birds from own stock developed the disease four to six months later.

Outbreak 12.—Disease appeared only in birds bought from dealer "A." Birds from other flocks remained healthy (*c.f.*, outbreak 13).

Outbreak 13.—Disease appeared in birds bought as chicks from dealers "A" and "B." ("B" chicks had been

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Fowl Pox.

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Fowl-pox is one of the commonest diseases affecting the adult fowl and is the cause of heavy annual loss to the poultry industry throughout the world.

It is a contagious disease due to a filter-passing virus, characterised by eruptive lesions on the unfeathered parts of the head, by yellow cheesy membranes in the mouth and by an oculo-nasal discharge. Any one or a combination of these lesions may be present.

The term " roup " should not be used in reference to fowl-pox, as roup (contagious catarrh) is a separate entity.

The author does not agree with the frequently expressed opinion that agents other than the specific virus may produce lesions in the mouth which are clinically indistinguishable from those of fowl-pox. There is no evidence that bacteria alone can produce typical false membranes in the fowl and while they may play an important secondary part the preliminary action of the specific virus appears to be essential.

Although it is generally agreed that fowl-pox virus belongs to the class of filter passers, it is difficult to pass it through porcelain filters and usually only a minute quantity passes through.

Infection almost invariably results from the direct contact of diseased and healthy birds in cage experiments. It was shown, however, that when healthy and infected fowls were placed in separate cages, facing each other, but a distance of 18 inches apart, infection did not occur. Neither did infection result when the cages were placed in direct contact, but the birds separated by a finely perforated metal sheet. It would appear, therefore, that direct contact between diseased and healthy fowls is essential for infection to occur. The natural method of propagation is probably through wound infection.

The author points out that a survey of the literature shows a wide divergence of opinion on certain aspects of the disease and considers that this may be partly explained by the tendency of many investigators to apply to the disease in fowls conclusions based on experimental work in pigeons.

The viruses of fowl-pox and pigeon-pox are immunologically indistinguishable, yet they are in some respects, probably as the result of species adaptation, sharply differentiated.

A considerable amount of work was carried out to ascertain if " recovered " birds could act as carriers of infection, but no evidence in favour of this could be produced.

The relationship between the viruses of fowl-pox and vaccinia is discussed. Cross immunity tests with the two viruses proved that fowl-pox did not immunise against cow-pox and cow-pox did not immunise against fowl-pox.

For many years efforts have been directed to the elaboration of a reliable method of immunisation, but until recent times with little success. Dead virus confers no protection, while virus modified or attenuated by either physical or chemical means gives such inconstant results as to be of little practical value.

Immunisation by live virus, which has been extensively employed during recent years in America, is discussed.

The author remarks that circumstances may sometimes justify the use of live virus, such as on heavily infected premises, but it is clear from published reports that its employment is followed by severe constitutional disturbance in a considerable percentage of the inoculated fowls.

There is usually loss of condition and frequently more or less severe generalisation of infection, while occasionally heavy mortality is encountered.

The immunisation of fowls by means of live fowl-pox virus, whether in weak dilutions or modified by heat, is in general considered to be too unreliable in action to justify its use, and with the recent introduction of vaccine prepared from pigeon-pox virus, it is unlikely to be again employed.

Fowls inoculated with pigeon-pox virus are solidly immunised against severe natural infection, and partially protected against artificial infection with fowl-pox virus. Immunity is established about the fourteenth day after inoculation. The vaccine does not give rise to any constitutional disturbance, loss of condition, or, as far as has been ascertained, interfere with egg production.

It may, therefore, be claimed that vaccine prepared from pigeon-pox virus is a valuable agent for the protection of fowls against natural infection with fowl-pox. And when

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hatched from eggs bought from " A.") Birds bought as chicks from another dealer remained healthy.

Outbreak 14.—Disease appeared in birds bought as chicks from dealers " B," " D," and " E " (*c.f.*, outbreaks 6, 7, 8, 13, 14). Own stock remained healthy.

Outbreak 16.—Disease appeared in birds hatched from eggs bought from infected premises " G " (*c.f.*, outbreak 17).

Outbreak 17.—Disease appeared in birds hatched from eggs bought from infected premises " G."

Summary.

The histories of 17 outbreaks of fowl paralysis afford strong evidence that the disease may be spread by eggs and young chicks.

In view of the serious consequences of an outbreak of fowl paralysis, poultry farmers should buy eggs and young chicks only from flocks known to be free from the disease.

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Fowl-pox and Coryza.

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In this paper the author confines his discussion of fowl-pox and coryza to the results of research and observations that have been made in the United States of America.

Fowl-pox is caused by a filtrable virus the proliferation of which is largely, if not entirely, cellular. Quite definite evidence exists that the inclusion bodies observed in the hyperplastic epithelial cells are intimately concerned with the etiology of the disease. The results obtained by other investigators indicate that the inclusions are true virus bodies.

Very little is known regarding the manner in which fowl-pox often so rapidly spreads through a flock. The positive results obtained by Kligler *et al.* on the mechanical transmission of the disease by mosquitoes are accepted. In the author's view it seems probable that these and other insects may play an important rôle in spreading the disease.

A description is given of the various methods of vaccination against fowl-pox used in America. The indications are that immunisation by cutaneous application of unattenuated or unmodified virulent fowl-pox virus constitutes an efficient and satisfactory procedure.

All who have had experience in field use of live virus vaccine agree that the most suitable time for vaccination is during the summer months, when the fowls are from three to four months old. The use of live virus on laying fowls has commonly been found to affect egg production adversely. This class of fowls has also been observed by some to show a greater tendency towards severe post-vaccination reactions than non-layers. The danger of such occurrences is not thought to be so great, however, as to make the vaccination of laying fowls a practice to be avoided entirely if, without vaccination, there is a great likelihood of their becoming severely affected with fowl-pox.

Coryza has not been established as a specific infectious disease. Investigations by Pritchett, Beaudette and Hughes have, however, shown that in many flocks the disease may be due to the localisation in the nasal passage of infection with the fowl-cholera organism. Stiles and Bunyea have reported good results in prevention and treatment from the use of a bacterin prepared from avian strains of *Staphylococcus aureus.*

Vitamin A deficiency produces lesions which in some respects resemble those seen in coryza. The differential diagnosis of the two conditions is discussed.

Infectious bronchitis also shows clinical features not unlike those exhibited by the diseases previously described. Although the disease can be easily transmitted by material from the trachea, the etiology remains obscure. The predominant symptom is pronounced dyspnœa, due to an accumulation of exudate in the larynx and trachea. The disease is widespread in America and in some sections is, at present, the most important cause of mortality in poultry flocks.

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employed in conjunction with hygienic measures, it should bring about a rapid and marked reduction in the incidence of the disease.

Discussion on a Comparison of Radiological Problems in Man and Animals.*

Major A. A. Pryer: I propose to limit my remarks to the radiology of the larger domesticated animals, chiefly the horse. Early investigators, working with primitive apparatus, obtained unsatisfactory results, and this fact, coupled with the cost of the apparatus, acted as a deterrent to further investigation.

I regard this as unfortunate, for I believe that with an up-to-date installation, radiological examination may assist in a sufficient number of cases to warrant its adoption as an ancillary means of diagnosis.

I doubt, however, whether I can bring forward anything of value as a basis for comparative discussion; the horse is rather in a class by itself, and my experience is a limited one. I am not trained in radiology, but as a veterinary surgeon I have been interested in the art for the past four years, during which period I have radiographed seventy different living horses, with a total of 230 exposures, and have made about eighty further exposures on cadavers, for calibration and experimental purposes.

The difficulties as I see them are threefold:—(1) The bulk and indisposibility of the patient, which compel us to work at excessive distances. (2) The thickness and irregular outline of most parts of the horse's skeleton, which cause variable shadows difficult to interpret. (3) The designing of suitable apparatus. The maker often has difficulty in appreciating the peculiar requirements of the horse, while the veterinary surgeon, lacking knowledge of X-ray physics, is unable to help, a trouble not likely to be overcome until some veterinary surgeon undergoes an *ab initio* training in radiology.

It may occasion surprise that I make no mention of resistance on the part of the patient as a difficulty. It is our experience that with patient handling and proper manipulation—an art in which the X-ray team must be trained—the number of horses which cannot be radiographed because they resist is very small. It is important, however, to remove any excess of high spirits by giving the patient exercise during the forty-eight hours preceding exposure to X-rays. A restricted diet is advisable for the same reason, and we impose the same preparation as would be employed for a major operation. A narcotic, in the form of one or two ounces of chloral hydrate, administered by the œsophageal tube, is useful at times, although the response to this medicament may be manifested by a motor inco-ordination, rather than by dulled mental perception. We plug the ears with cotton wool as a routine measure and find it indispensable in preventing muscular tremors, which are often produced by the noise set up when the switch is let in. The shoe should always be removed before radiographing the hoof, as the metal causes undesirable scattering.

Types of Apparatus and Technique.—Much of our early work was done with a hard tube possessing a gross focus,

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and the results were poor. Experience to date has shown that the best photographic effect is obtained with a transformer set, with a medium-line focus metallic tube, which will give a steady output of 80 kilovolts and 42 milliamperes: with this, for almost every part of the horse that is radiologically accessible, we use a tube-film distance of 26-in., and an exposure of two seconds, which has been proved by experience to give the best results. Fast work is obviously desirable; attempts to employ a Potter-Bucky diaphragm have afforded no help, and a tube box capable of being moved in any direction is necessary. It seems to be a curious equine psychological fact that a nervous patient is less likely to resent an unusual-looking object being brought near to him than to be asked to approach the object.

I have no experience of radiographing horses in the recumbent position, but there are a few regions, such as the patella and mandible, in which adoption of that position is almost certain to facilitate radiological examination. I am doubtful, however, whether it will extend the field of utility as much as one may be inclined to anticipate. In many of the conditions in which the recumbent position would help—as for instance, disease of the cervical vertebræ—the nature of the suspected lesion would constitute a clear contra-indication to the forcible throwing of the animal.

Parts of the Horse, Radiological Examination of which may assist Diagnosis.—Almost every part of the horse's body is a closed book to the radiologist, with the exception of the limbs. This field may appear to be a restricted one, but its peculiar importance in veterinary practice needs no emphasis. When we succeed in producing radiograms of the horse's limbs, of constant good quality, we shall have gone to a useful length.

I am unaware of any attempts, successful or otherwise, to radiograph the horse's brain, spine, heart, lungs, kidneys or bladder. Further, since the horse is fortunate enough not to possess a gall-bladder, the need for cholecystography is non-existent. By the courtesy of the Principal of the Royal (Dick) Veterinary College, Edinburgh, I have seen some films of the horse's mandible and teeth, taken with the film in the intra-buccal position. So far as I know, they contribute the first efforts in X-ray examination of this region and the results seem sufficiently promising to merit further exploration.

With regard to the radiography of the horse's abdomen—we have made several attempts, in the first place on normal animals, and secondly on one horse in which a sarcoma of the pylorus was suspected and on another in which an intestinal calculus was probable. *Post-mortem* examination confirmed clinical diagnosis in the first of these two cases but not in the second. Radiological examination helped diagnosis in neither, although it told us a certain amount in other ways. The technique in all cases was purely experimental. After fasting, the animals were given 1½ pounds of barium sulphate with gum acacia and water by the stomach pump. Examinations were made at the fourth, eighth, tenth, and eighteenth hours. Barium shadows were seen but their localization was impossible. Peptic ulcers and malignancies of these parts are rare, as compared with those in man, and the call for X-ray assistance in diagnosis may seem far-fetched. However, it is well to know where we stand, and I think anyone desiring to explore this region further may take it that barium shadows can be demonstrated in the horse.

This year two Continental workers have published a lengthy account of the digestive processes in ruminants, as ascertained by X-rays. The investigation was more physiological than radiological, and as only small animals (young goats) were employed as subjects, no technical difficulties were encountered. The inquiry is of interest, however, as denoting a new field of employment of the X-ray in veterinary science. I say a new field, because ruminants were used; Cannon, of course, used cats for a similar purpose many years ago. It is also worthy of mention that Theiler used X-rays as an auxiliary in his researches into the mineral deficiency diseases—particularly aphosphorosis—of cattle in South Africa. Valuable information was obtained from a comparison of the widths of the compact and spongy tissues of the long bones in healthy and affected animals respectively.

Now as to the radiology of the horse's limbs. Commencing above and working downwards, I know of no method of satisfactorily radiographing the shoulder, pelvis or hip. Not only is the approach to the bone which it is desired to X-ray covered by the corresponding bone of the opposite side, but the thickness of the body causes scattering which ruins the picture. The difficulty might be overcome in some cases by making the exposures from an ascertained angle, but much experimental work is necessary, and the infrequency of diseases of these regions has caused us to defer the inquiry. Much the same applies to the femoro-patellar-tibial articulation, although examination of this joint might be of more value clinically. We have found difficulty in penetration in this region, but with our present apparatus I believe this could be overcome. The shafts of the radius, ulna, tibia, and fibula are accessible, and X-ray examination is useful in suspected subperiosteal fracture. Lateral examination of the carpus is always worth carrying out. Antero-posterior views of the carpus are less easy to interpret, owing to the diffuse shadows cast, unless the rays pass perfectly straightly through the large interosseous canals. The metacarpus, metatarsus, and proximal and mesial phalanges can be well demonstrated, laterally in both limbs, and in addition antero-posteriorly in the fore-limbs and postero-anteriorly in the hind limbs. In these regions the casette is held by the hand of an assistant since mechanical holders have proved of no value. In view of this the amount of blurring due to movement is surprisingly small. There is usually a little evidence of movement over the sesamoids, but it is unlikely to impede diagnosis. Radiological examination of these regions is useful in suspected fracture, foreign bodies, osteo-periostitis, and exostoses of all kinds. Information as to the presence or absence of an arthritis—and when this exists, the degree of joint involvement—is often forthcoming.

X-ray examination of the horse's foot and the structures within it opens up perhaps the most valuable field of all. The differential diagnosis of chronic disease in this region is most difficult at times, and radiological examination may afford great help. X-ray pictures of the feet of different sound and lame horses, taken by a standardized technique, showed marked variations which can be observed with a little practice. I have drawn certain conclusions from what I have seen, but it will take much

time and experience to interpret their real significance. Radiograms showing pedal osteitis are rare, whilst variations in the size and shape of the navicular bone are common. As navicular disease is incurable, we have been in the fortunate position of being able to compare clinical symptoms, radiological findings and *post-mortem* appearances, and we find the X-rays pretty well vindicated. To radiograph the foot, including the navicular bone, necessitates a definite technique. We have never succeeded in showing it properly in an ordinary antero-posterior position. The navicular bone affords a curious problem to the X-ray examiner. It is a small bone, say two and a quarter inches in length and three-quarters of an inch in width, situated deeply within the horse's hoof, and radiological access to it is through the much thicker os coronæ, a position comparable in some ways possibly to a postero-anterior of the human patella. The technique we employ is as follows:—

The shoe is removed, and the frog clefts are cleansed and filled with horn paste; if the clefts are not so filled, their irregular outline throws shadows which mask the navicular region. With the exposure data previously mentioned, the horse stands on a reinforced aluminium casette and the rays are centred on the pyramidal process of the os pedis, from an angle of 60 degrees. The absence of appreciable distortion has been checked by a series of mensural tests. What are the X-ray appearances of a diseased navicular bone? I suppose caries of the tendinous surface of the bone is what one would expect to see. We found some difficulty in demonstrating these carious areas. The middle cleft of the frog crosses the region one wants to see and any small foreign body, such as a fragment of grit, may throw a shadow resembling a carious area. Hence the margin of error was large, and other changes which occur frequently in diseased navicular bones were looked for, namely: (1) Increased width of the bone, due presumably to a rarefying osteitis and evidenced by a fluffy appearance mainly at the superior border. (2) The formation of bony spurs at the extremities of the bone. These spurs are not constant but occur very frequently, and when present are the most easily demonstrated pathological change.

From examination of over 200 navicular bones I find it most exceptional to get the spurs without carious areas being present in the tendinous surface of the bone, I believe if one can demonstrate these spurs radiologically, one may diagnose navicular disease without any hesitation. The matter of the early diagnosis of navicular disease in army horses is of economic importance. To wait until clinical symptoms are sufficiently marked to warrant an order of destruction may entail feeding a useless mouth for months. I have encountered one further appearance in five cases which I cannot interpret. This is an abnormal strand of bone which appears to run from the extremity of the navicular bone to the wing of the os pedis. I call it the "osseous bridge" and have found it only in lame horses. The five cases are at present under treatment but follow-up steps have been taken and I hope to make autopsies in due course. Is this strand of bone due to ossification of a portion of the coronopedal ligament? If so, it seems to be a condition we know very little about.

Fluoroscopy.—I have been unable to employ the fluorescent screen usefully in equine practice. To see anything at all, a much higher current is needed than that customarily used, with regard to the safety of the operator.

The Therapeutic Use of X-rays.—I can find no records of X-ray therapy for horses, but it ought to be tried, and I suggest canker of the foot as a good subject for a starting-point.

Dr. R. W. A. Salmond: In the examination of animals there are obvious technical difficulties, rising to impossibilities in the case of the larger ones. Some time ago I was asked to radiograph the hind limb of a pigmy elephant, and a fractured bone with a fragment of bullet *in situ* was shown. What impressed one most at the time was the great density of the hide and soft tissues as compared with the human. The animals usually examined are less difficult. The smaller ones present few or no technical difficulties, but the larger ones may require a special radiographic table, or a veterinary operating table. The transport of the larger ones such as racehorses or valuable hunters, may be out of the question, and a portable apparatus is necessary.

Whatever apparatus is used, it should be powerful enough to allow the exposure of any ordinary-sized limb to be made in the fraction of a second with intensifying screens. This dispenses with the question of an anæsthetic and also solves many of the other difficulties in dealing with animals. It should be as noiseless as possible and no part of the tube should be brought nearer than 12-in. to the animal lest, its hairs being electrified, it should take fright. Disappointments and failures in animal radiology are, it is thought, mostly due to faulty technique. As there are no sure means of getting an animal to hold its breath, one has to depend on very rapid exposures to overcome the movements due to respiration, otherwise the shadows are blurred, especially those of the internal parts.

The most common conditions for which examinations are made are fractures and dislocations, or both combined, and foreign bodies swallowed or embedded in the soft parts. It is good practice to re-examine dislocations after reduction to make sure that they are really reduced, and it is well to remember that some swallowed foreign bodies, such as corks, pieces of stick, or sponges, may not cast any shadow. Since greyhound racing has become so popular, much work is done in diagnosing fractured toes and dislocations of the toe joints. Other uses are the determination of sarcoma, endothelioma, and tuberculosis of the long bones of dogs and cats, and diseases of the foot and limb bones in horses, also the detection of urinary calculi in dogs, the size of the pelvis in relation to breeding, and the determination of gestation. The internal examinations, as opposed to those of the limbs, are more difficult. Compare the natural attitudes of animals with those of man. The latter quite naturally lies on his back or stands facing you, and you see the two sides of his body quite separate. When an animal is standing or lying naturally, the two sides of its body are usually more or less superimposed, but if it is put in the dorsal position and the fore-limbs drawn up and the hind limbs down you can then see the two sides separately, and examine for, say, a stone in one or other kidney. Cases are recorded from time to time in which X-rays have failed to show stone when this was present; these failures are probably due to the technique rather than to the composition of the stone. It is interesting that the chemical composition of stones in dogs is similar to

that of those in man. By a barium feed the condition of pyloric stenosis in dogs can be determined, or whether a swallowed foreign body is in the stomach or has passed further on. If in the stomach, the opaque fluid will be found to obscure the foreign body. No difficulty need be experienced in getting a dog or a cat to take this meal, in fact they usually take it with a better grace than human beings do.

The thorax offers fewer opportunities. The more important smaller animals—dogs and cats—are, in this country, relatively resistant to pulmonary tuberculosis, but hernia of the diaphragm, opaque foreign bodies in the lungs or gullet should be detected, and also the less common conditions of hydrothorax, pneumothorax and actinomycosis. In the larger animals the examination is almost impracticable.

Some animal parasites are found both in man and in the lower animals, so that they are of medical and veterinary interest. When calcified or situated in an air-containing space, such as the lung, they are readily detected by X-rays. Most important radiologically are hydatid cysts, the cysts of *Cysticercus cellulosæ* and trichinosis. Hydatid cysts are occasionally found when one is radiographing the human lungs or abdomen, and show a fairly characteristic globular shadow, with usually a calcified wall. In the abattoirs these cysts are common and can be seen infesting the organs removed from cattle, sheep and pigs. Calcified cysticerci are also occasionally seen in the muscles of man as elongated opacities, about 1 cm. in length, lying in the direction of the muscle fibres. In those animals infected, namely pigs, dogs and cats, they show a similar appearance. Radiography for the detection of both these parasites is, however, not an economic undertaking in animals.

Another problem is that of expense. This may arise, especially in private practice, and if the economic value of an animal is taken into account, the requisite fee may be relatively high to that value, and is a limiting factor to more universal use of the rays. Fortunately there are other considerations, and when once an animal has found a place in our hearts and homes, a high value is generally placed on its life.

The interpretation of the films or screen examination should be done by a qualified veterinary practitioner. The bones of the limbs and spine of animals are different from those which a medical radiologist is seeing daily, and, if only for this reason, it is thought that animal radiology should be in the hand of veterinary—rather than of medical —radiologists, unless these latter have had some training in veterinary science. The converse, of course, holds good. For those veterinaries not conversant with the many pitfalls in radiology, they are advised that a negative opinion on screen examination alone, especially as regards a fracture, should not be relied upon. Skiagrams should be asked for, as being more accurate and constituting a permanent record.

In radiotherapy much work has been done on the action of X-rays and radium on experimental malignant growths in rats and mice, and has added to the knowledge of the effects of this treatment in allied human tumours. Bearing in mind the results in these animals and in man, veterinary practitioners might consider the treatment of sarcoma and carcinoma in dogs by similar or combined means. It is interesting to note that domestic animals are affected with practically every variety of malignant neoplasm known to pathology. The valuable information on the action of X-rays on the different blood-corpuscles in animals has helped in the treatment by radiation of certain blood diseases in man, and might be used in the treatment of canine leucæmias.

The nutrition value of food stuffs as regards their vitamin and other essential contents, has been demonstrated by the growth of the bones in young animals and their controls, as shown by X-rays, and is being utilized in the prevention of deficiency diseases both in man and animals.

The sterilization of bitches and female cats by X-rays, when there is no question of breeding, to prevent the unpleasant events which occur at the œstral periods, might be considered as an alternative to the surgical method of spaying. Published references to this are hard to find.

While one fully realizes that, owing to circumstances, veterinary surgeons have to rely mainly on their own clinical acumen for a diagnosis, rather than on laboratory examinations—the multitude of which, it might be said, has almost befogged the medical profession—one cannot help thinking that radiology will be more and more widely used in veterinary practice as its value in suitable cases becomes better known, not only amongst themselves, but also among the laity. It will, of course, be remembered that this examination is meant not to supplant, but only to supplement, the manual examination.

In research work, radiology opens a fascinating field in the investigation of the internal functions of animals, many of which are as yet imperfectly known. Their elucidation would not only afford valuable information for veterinary science but would have a direct bearing on the better understanding of similar problems in man. The classic observations of Cannon, soon after the discovery of X-rays, on the movements of food in the stomach and intestines of the cat, were for a long time the basis of the accounts of these movements in textbooks on human physiology, and show how very closely related are the problems of human and animal physiology and pathology.

Lastly as to the future of veterinary radiology. This lies in well-equipped departments in the veterinary colleges, army veterinary hospitals, and veterinary surgeries, and also in the X-ray laboratories of institutes of anatomy and physiology, and of zoological gardens, but not in hospitals or clinics where human beings are examined. Speaking in general terms, veterinary radiology has not been developed so much as it might have been, and it is surprising to find how little reference is made to radiology in many veterinary textbooks. For further progress it is suggested that :—(1) More qualified veterinary surgeons should employ radiology, just as radiography was taken up by medical men and developed into medical radiology. (2) Every veterinary college should have a well-equipped laboratory under proper supervision. (3) Radiology should be a recognized part, however small, of the training of veterinary surgeons.

Lieut.-Colonel E. Middleton Perry: The scope for radiology in veterinary science is much less than in the sister profession, and the work is essentially much more superficial. By this I mean that we are not able to go into the finer details in diagnosis by means of radiology as in the case of the human subject.

For instance, the employment of a bismuth meal in our patients is a very difficult problem. To obtain the desired result, we cannot get our animals to swallow the meal slowly and when required, neither can we get them to keep still while the preparation is being swallowed, in order that we may watch its progress down the alimentary tract. If this could be done it would be of great assistance in ascertaining the presence of foreign bodies of low specific gravity and less opaque nature, which one so frequently finds in the dog.

The use of X-rays for the diagnosis of gastric and duodenal ulcers in veterinary surgery need hardly be considered, as I believe these cases are extremely rare in our patients.

Again, owing to the small compass of the abdominal cavity of the majority of our canine patients, many foreign bodies, calculi, tumours, or other abnormalities can be felt by palpation, and therefore resort to X-rays is not necessary, and the same remark applies to many cases of fracture of the limbs.

These few points clearly show that there is not the scope for this kind of work in our patients, that the finer points of radiology cannot be made manifest, and that for the present we must make use of the rays chiefly to help us in the diagnosis of some of the more obscure fractures, callosities and the presence of foreign bodies.

Before expressing a definite opinion as to the reading of some radiographs considerable experience is necessary, as it is often by no means easy for the uninitiated to read a negative correctly. It is advisable to have a set of normal negatives for comparison.

Dr. J. B. King: I wish to review briefly some of the problems which have been raised within the last few years as a result of the X-radiation of the ovary in animals and human beings. As early as 1905 various workers had reported that, as a result of radiographing the ovaries, there was a rapid and complete disappearance of the Graafian follicles. This work was confirmed and extended, but up to 1913, research in this direction was almost entirely histological. More recently, experimental work done with mice sterilised by X-rays has led to great advances in our knowledge of ovarian function but has, at the same time, raised some interesting problems. By the introduction of the vaginal smear technique in mice, by Allen and Doisy, a reliable means has been provided for the study of the œstrus-producing ovarian hormone. While ovariectomy produces a complete cessation of the œstrus-cycle, Parkes and others have shown that no such change follows a complete destruction by X-rays of all the Graafian follicles in both ovaries, and that the normal sexual cycle will develop in mice when the ovaries have been irradiated before puberty. The œstrus-producing hormone can, therefore, no longer be regarded as entirely a product of the follicles.

An interesting comparison with these results is found in the human female, where a cessation of menstruation follows treatment by X-rays of sufficient intensity to affect only the follicles. Further, however, it has been found by extended use of X-rays in gynæcological practice that, if the treatment is given during the first two weeks of the inter-menstrual period, the sterilisation is immediate and no further period will follow. But if the treatment is given during the second two weeks, one, two, or even three, periods may occur. As it is now generally accepted that ovulation takes place about the 14th day of the cycle, there is here strong evidence of a causal relationship between ovulation and menstruation.

As has been described, X-rays have been the means of demonstrating that œstrus is not a direct result of periodic ovarian function. What then, is the controlling influence? Working from various clues, one of which was the well-known association of sexual aberration with hypophyseal disturbance, it has been established that the ovary is subject to control by an internal secretion from the anterior lobe of the pituitary body. Injection of extracts of the anterior lobe have been found to have remarkable effects on the ovary, one of which is the production of abnormal ovulation and excessive corpora lutea formation.

It has been shown that experimental irradiation of the ovaries has led to important findings, in no way indicated by ovariectomy. It is logical to expect that irradiation of the pituitary body will yield similar results. Excision of the pituitary body in rats has been done by Smith, but in X-rays we have a means by which certain cells may be destroyed, while others are kept intact. At present the anterior lobe of the pituitary body is credited with the production of two, three or even four distinct internal secretions. I suggest that X-radiation of this gland offers one of the most likely lines of experimentation. For the study of the effects of the pituitary body on the ovary it is desirable that the work should be done on mice, and this may be possible by the use of a narrow beam of gamma-rays, produced on lines similar to those followed in the radium "bomb" treatment of human carcinoma.

Professor J. McCunn said that some time ago at his institution they had a horse which was suspected to have odontomata. The horse was cast and radiographed, and the odontomata showed up very well. Sinuses in the horse's head could also be examined, and it could be seen whether or not the teeth were normal. Often alveolitis could easily be demonstrated in the horse. The antero-posterior view of the carpus in the horse was difficult because the pisiform was in the way. At an earlier date he interpreted the shadow of the pisiform as an abscess, and took credit to himself for having effected a remarkable cure of the condition! The navicular bone was the bugbear of the veterinary surgeon: probably Major Pryer would obtain more valuable results from lateral views. Caries of this bone might occur, and sometimes it showed an erosion one-eighth of an inch deep.

Examination of the dog by X-rays was not difficult. He (the speaker) had recently had four examples of hydrothorax in that animal, and the X-ray findings had been very good.

A point had been raised about the hair being electrified. A radiologist told him that there was nothing serious in this. He found that immediately one switched on the machine, when radiographing the horse, the animal gave a jump, but was afterwards still. The rays were very useful for detecting fractures and dislocations. He thought at one time that nothing could be done in a case of dislocation of the head of the femur of the dog, an accident which, in these days of motor vehicles, was very common, but in 80 per cent. of the cases this could be reduced and

the dog restored to normal with the diagnostic aid of X-rays.

Dr. Salmond had introduced the question of gestation in dogs. A good deal of work had been done on that subject, but the rays had not shown any fœtal puppies in his (the speaker's) cases, probably because of the amniotic fluid. Dr. Salmond had suggested that radiologists should concentrate on stones in the kidney and pyloric stenosis in dogs, but these were very uncommon in the dog. Gastric and duodenal ulcers also were rare in dogs. Large dogs frequently suffered from osteosarcoma of the lower ends of the radius, and X-rays were useful in detecting this.

It was doubtful whether X-rays were of much use in the sterilisation of animals; the effort was generally in the other direction—trying to make sterile animals fertile, and to this end ultra-violet rays were used. He knew one case of the kind which was a success. There was much scope for the use of X-rays in animal practice; the chief difficulty was one of finance.

Dr. A. E. Barclay said he did not think that the range of X-rays had been adequately explored in physiology and zoology, or in veterinary surgery, and there was an enormous field waiting. Just as radiology had changed human clinical medicine, so it would, in due course, change many conceptions of veterinary work and comparative anatomy. In conjunction with Mr. Harris, of the field laboratories, much work had been done on the question of vitamins as affecting the epiphysis of rats. In studying the mechanism of swallowing he had found that cats were too temperamental for the research, and dogs bolted their food, whereas hens and worms behaved quite nicely! There were many problems connected with swallowing in man on which light was thrown by X-ray investigations on animals. Textbooks on physiology stated that the act of swallowing was a succession of propulsions, beginning with the tongue, but a study of the hen's mechanism showed that it was largely accomplished by suction.

The hen was a great air-swallower, probably because of the size of its pharynx. One could also watch seeds being digested in the gizzard, and see the length of time taken for the food to move along. The mechanism of defæcation was also interesting to study. The rectum straightened out and was drawn back over the wastage, thus bringing about its expulsion. In fact, the whole mechanism of the alimentary tract in animals was a *terra incognita* that was ripe for exploration by means of X-rays. It was a line of research that was not only of value in itself but had great possibilities as a comparative study that would help us to understand more of the mechanism in man.

Dr. James F. Brailsford: There is no question that the chief factor against the use of radiology for animals is the expense. No expense, time or skill is spared in the treatment of human beings, even when it is known beforehand that the best result will mean that the patient will be more or less of an invalid or cripple. In the case of an animal—even of a pet—its future condition is seriously considered, and if the prognosis suggests disablement it is usually decided to "put it to sleep." Personally, I think that there is a tendency to give this advice too often, without making quite sure of the diagnosis.

For the X-ray investigation of animals, the plant needs to have the greatest output, because most of the radiograms have to be taken instantaneously and from a distance of three or four feet, owing to the difficulty of controlling the movements of the animal. In order not to alarm the animal the apparatus must work as silently as possible and anything like a sudden noise from a switch or rotary must be avoided. For the X-ray examination of dogs, cats, and the legs of most animals, the films of the size ordinarily in use in a radiologist's department are sufficient, but if the chest or abdomen of the larger animals such as cattle or horses is to be examined, much larger films have to be used.

There are many conditions in animals the diagnosis and treatment of which would be helped by radiography. Many of the pathological conditions found in man are seen in animals, though the frequency may be much different and the lesions dissimilar. As an instance, tuberculosis in cattle and pigs is fairly common and is frequently seen involving not only the lungs, liver and serous membrane, but also the spinal column. Bone disease can be shown by X-rays, and as calcification takes place earlier in tuberculous deposits in these animals, and to a greater extent than in man, the lesions would be more readily shown in a radiograph. Hydatid disease of the lung, relatively uncommon in man, but very much more frequent in animals, could be detected. Strongyli in the lungs of animals are so common and apparently of so little importance that they are ignored, but, in the sheep particularly, *Strongylus rufescens* readily calcifies and radiograms of the lungs give a picture rather like miliary tubercle. Gas formation in the limbs of animals suffering from "black leg" or "quarter evil" could be detected by X-rays. The calcifications in the muscles of animals, due to sarcosporidia, would be shown in the radiograms.

The X-ray demonstration of lesions in the food animals, though of scientific interest, is much too costly for veterinary practice, and could only be considered in animals of great value for breeding purposes. The expense of a first-class X-ray unit and its upkeep is more than could be reasonably borne by any veterinary surgeon in general practice, apart from the time which would have to be given to a study of the technique of radiography and the interpretation of the radiograms. To attempt the work with small apparatus would only be to go to an expense which would bring disappointing results.

The greatest use, however, of X-ray investigation of animals is the detection of fractures and the position of the bones and the detection of foreign bodies. In connection with these investigations I have had the co-operation of Mr. T. N. Gold.

The actual demonstration of the site of fracture and the position of the fragments assists the veterinary surgeon in treating the condition. Often the lesion is quite away from the supposed site, and rest is given to the uninjured part, while strain is put upon the injured bone. Without the aid of X-rays, fracture of the elements of the carpus and tarsus is frequently missed. This occurs only too frequently in man, who can point to the site of the pain.

The fragments can be set in good alignment, and radiograms can be taken subsequently in order to see whether sound bone union has occurred.

The detection of foreign bodies, particularly those

obstructing the alimentary canal, is perhaps the best life-saving use of X-rays. As with man, a preliminary search for the foreign body must be made before any opaque meal or enema is given. If this does not reveal the foreign body, barium paste can be watched down the œsophagus and through the alimentary canal. Or, if the obstruction appears to be in the lower bowel a barium enema can be given. [A series of radiograms, illustrating obstruction in the œeophagus of a dog, only seen after thick barium paste had been given, was shown.]

I have known of a number of animals diagnosed and treated for such things as "internal distemper" and "gastric influenza," in which an X-ray investigation has revealed the presence of a foreign body. Cattle frequently swallow long pieces of metal wire in their fodder, and this in many cases pierces the stomach and the pericardium. It would be possible to detect the wire by an X-ray investigation and in this way assist the diagnosis and prognosis where the value of the animal warrants such an expensive investigation and subsequent treatment, in face of the risks of any operative procedure. Much information in comparative anatomy, physiology and pathology can be obtained by radiographic investigation.

Dr. E. Eidinow said that one thing common to men and animals was the question of the lethal action of rays. Both men and animals could be burned and killed by heat. A section of the profession maintained that there was no such thing as "light stroke," but it was found possible in the laboratory to kill animals by pure visible light, excluding the infra-red rays. Animals could be killed by visible light if photo-dynamic substances were used, and also by intensive doses of ultra-violet rays, but it was necessary in that case to shave off the hair to get the full effect. Ultra-violet rays could only act on the surface layers of living tissue cells.

Animals could also be killed by intensive doses of X-rays and radium. When looking at the pathological picture of animals which had been killed by any form of radiation, one was struck by a common similarity of all of them. He was studying the action of intensive luminous rays and the appearance of animals killed by ultra-violet rays. He found that the animals often died two or three days after irradiation and showed an area of necrosis in the skin and intestines, with a hæmorrhagic condition of the lung, and what he took to be thrombosis of the coronary vessels of the heart. If the *post-mortem* examination was carried out immediately after death it would be concluded that the animal died from thrombosis in some of the large vessels.

He had carried out a research with radium, using beta- and gamma-rays. He used small rats weighing 50 gm., and applied a 100-mgm. plaque screened with 1 mm. of silver, and the rat died within four days if about 15 hours' irradiation was given. It was therefore possible to standardize a lethal dose of radium for the rat. Again, as with intensive luminous ultra-violet irradiation, there were areas of necrosis and hæmorrhages in the gut, and there was probably thrombosis in the large vessels.

The hypothesis he wished to put forward, as a consequence, was that these forms of irradiation, by destroying cells, liberated some toxin—a cyto-toxin—which might damage the lining of the blood capillaries and so give rise to death in consequence of a clotting in the large vessels. It was a condition which he would call "radio-toxæmia."

Professor G. H. Wooldridge (President, Section of Comparative Medicine) said that the subject was divisible into two different sections: (1) the use of X-rays for purposes of diagnosis; (2) the curative effects of X-rays and other emanations or forms of light. The greatest sphere so far was the diagnostic, but he agreed with Dr. Salmond that X-rays should not be expected to supplant the ordinary manual examination; they must be looked upon as supplementary, in difficult cases. His own experience had not been with taking radiographs, but with their interpretation, of which he had done a great deal. In many cases he had been unable to get any assistance from X-rays, and sometimes a well-taken skiagram was misleading. He therefore relied chiefly on ordinary clinical methods, though admittedly the rays constituted a valuable supplement.

Major Pryer spoke of the difficulties of radiographing the horse, and it could easily be seen that these difficulties were mostly due to the quantity and density of the body tissues to be penetrated. It was an easier matter in the case of the feet and the limbs. The technique suggested for radiographing these was doubtless valuable, and he hoped Major Pryer would persevere with it. He, the speaker, recently had to have a horse's foot examined by X-rays to see whether there was any disease of the navicular bone. It would be evident, from the pictures shown during this discussion, that it was easy to trace simple erosion when superimposed upon a dense layer of bone, perhaps 1½-in. thick. Major Pryer had stated that the presence of spurs at the end of the navicular bone was diagnostic of navicular disease, but in many cases of navicular disease there were no spurs.

His own chief difficulties had been in connection with urinary calculi in the kidney of the dog. So small were these stones and the tissues to be penetrated so dense, that it was very difficult to make them out. Stones in the bladder were easily detected. It was common to find urethral calculi in the male dog one-eighth in. in diameter; they were arrested at the os penis, just where a tubercle occurred on it. Only by careful and repeated exposure to the rays could these be detected. If the exposure was negative in this situation, he disregarded it and resorted to surgical measures, with good results to the patient.

Some of the skiagrams shown—such as those of cysticerci—were of no service to the clinician. They were from dead specimens, and he suggested that no one would dream of expecting to diagnose by X-rays calcified cysts in the musculature of a domesticated animal. It might not be the same with sarcosporidiosis, because often these were present without symptoms. In this disease in the sheep and pig X-rays might be useful for detecting it, but one would not imagine the owner of a pig ready to bear the expense of the rays for such a diagnosis; his line would be a matter of economy—if it was fit for food, well and good, if not, it must be destroyed.

With regard to sterilisation by X-rays, the subject was interesting, but the surgical process in animals was comparatively easy, and patients did very well after it. Even

after excision of ovaries and uterus, the animal would run about in apparent health within a week, and mares had been known to hunt on the day the ovaries had been removed.

His colleague, Professor McCunn, had said he had not been able to see the fœtuses in bitches by X-rays. He, the speaker, had had two successes in that way. A bitch was submitted to him which he had known to have calculus in the bladder. She was then pregnant and had gone a week beyond the normal time for delivery, and the question was as to whether operation should be performed. As she was becoming weak, he decided upon radical operation. The uterus, containing one pup and a portion of another, was removed, and a stone was taken from the bladder at the same time. In that case the puppy and all the details came out clearly in the skiagram.

The use of X-rays in experimental work would do away with the need of much vivisection; many functions, such as swallowing and peristaltic action, could be shown more clearly by X-rays. Shortly this radiograph would be linked up with the cinematograph, and by this means much experimental work in demonstrating physiology would be obviated.

Members of the Section of Comparative Medicine felt that they had yet a long way to go, and not much would be accomplished until a number of veterinarians could afford the time to take up radiology more thoroughly than had been possible up to the present.

Dr. Chalmers Watson said that this discussion had ranged around the word "comparison" and that could be applied in three important directions: (1) in regard to pathological appearances, (2) from the point of view of treatment, (3) from the wider and more important aspect of nutrition. He had hoped to learn from this discussion more of the fundamental aspect of the whole question in regard to nutrition in animal and plant life; all chronic inflammatory and degenerative changes in animals and man were end-results of some definite disturbance of nutrition. If it was true, as Dr. Barclay had stated, that radiology had profoundly modified physiology and clinical medicine, it was still more true to say that the wider application of what was now termed physiotherapy, to the problems of nutrition, to their disturbances in man and animals, and to their treatment, would exercise a much more drastic change in our present teaching and practice.

During the past year he had been directing some attention to diseases in pigs and poultry. Not long ago he had the joints of young pigs examined radiologically, and interesting appearances were seen in the bones and general skeleton. His difficulty, owing to the newness of the subject, was in getting assistance in interpretation from veterinary experts, but, judging from the enthusiasm shown in this discussion, it would probably not be long before that difficulty would be overcome. He had recently spent an interesting afternoon at an experimental poultry farm conducted by the National Poultry Breeders' Association, under a capable head. In one experiment which he had seen, Mr. Newman had tried out results with a much vaunted mash for poultry. That dietary had caused in many animals a complete picture of what is commonly regarded as rickets—a disturbance of nutrition revealed by the state of the feathers, anæmia revealed by physical and mental apathy of the bird, the colour, etc., of the comb, the enlargement of certain joints, and by other deformities. When asked what were the X-ray appearances, Mr. Newman stated that these were not known. Dr. Fulton, of the radiological department of Edinburgh Royal Infirmary, made a radiological examination of some of these birds, with an interesting result which it was unnecessary to give in detail at the moment.

Nutrition was profoundly important, and should be more carefully studied. The leading commercial houses which produced animal foods for use in the agricultural industry were now advertising irradiated foodstuffs, and it was very important that the commercial exploitation of these foods should not be in excess of what was known. For the past year or two he had been giving attention to ultra-violet rays as applied to milk, applying those rays to whole milk and to milk from which the fat content had been largely removed.

He would suggest that at some subsequent meeting this subject might again be reviewed, taking the wider standpoint of nutrition. Under present conditions the medical members of the Public Health service were specially interested in and sympathetic to the subject of "radiation" in all its important bearings.

In Parliament.

The following questions and answers were recorded in the House of Commons recently:—

Veterinary Treatment.

Mr. Freeman asked the Secretary of State for the Home Department whether he is aware that Mr. S. P. Male, of Reading, has, during 1930-31, performed a number of experiments on living animals for the purpose of gland grafting, calculated to give pain; that no licence has been granted to this gentleman; and what action he proposes to take in the matter?

Mr. Short: My right hon. Friend has inquired into the facts of this case and finds that the operations in question were performed by Mr. Male, in the ordinary course of veterinary practice for the purpose of treatment of the patients. They were, therefore, not experiments within the meaning of the relevant statute, and my right hon. Friend has no jurisdiction in the matter.

Mr. Freeman: Is no licence required in a case of this description, even although pain is caused?

Mr. Short: My right hon. Friend has no jurisdiction at all.

. . . . .

Veterinary Medical Research.

Lieut.-Colonel Fremantle asked the Minister of Agriculture when it is proposed that the scheme now being prepared for the development and co-ordination of veterinary medical research shall be put into operation; and whether an opportunity will be given to the House to discuss it before the details are finally decided?

The Minister of Agriculture (Dr. Addison): The scheme is still under consideration and I cannot yet say when it will be put into operation. The subject can of course be raised when the appropriate Vote is before the House.

. . . . .

In the course of travels and explorations in the islands of the Pacific, Miss Evelyn Cheeseman has collected for the Natural History Museum, South Kensington, 15,000 specimens of insects, many of them new to entomology. These are to be distributed to experts for study and classification, and later placed in the museum to serve partly as pure scientific material, and partly as weapons in the armoury with which the specialists on the staff combat any invasion of insect pests threatening crops or other material.

Communication.

The Species of *Eurytrema* in Domestic Ruminants.

By G. B. Purvis, F.R.C.V.S., Federated Malay States.

The following flukes of this genus have been described :—

(1) *E. pancreaticum* (Janson 1889) Looss 1907—with its synonym *E. cœlomaticum*—in the pancreatic ducts and duodenum of the ox, buffalo, sheep, goat, camel, pig and man (once) in Japan, China, French Indo-China, Java, Burma, Mauritius and Brazil.

(2) *E. parvum* Senoo 1908, in the ox in the Bonin Island, Japan.

(3) *E. dajii* Bhalerao 1924, in the bile ducts of the ox (*Bos indicus*) in Burma.

(4) *E. ovis* Tubangui, in the rectal fat of the sheep in the Philippine Islands. I have no literature bearing on the second and fourth, except such scanty information as Baylis[1] gives.

Eurytrema flukes are quite common in Malayan cattle in the pancreatic and bile ducts and in the duodenum. I have examined a large amount of material in an endeavour to classify it.

The following table illustrates the chief points of difference between the *E. pancreaticum* and *E. dajii* according to the literature available to me.

	E. pancreaticum.	*E. dajii.*
Size	8-15 × 5-7 mm.	... 5-6·7 × 3·5-4 m.m.
Cuticular scales ...	Absent	Present.
Posterior end of cirrus sac	Reaches level of anterior border ventral sucker ...	Does not reach that level.
Vitelline glands ...	In 10-12 groups ...	In 10-13 elongated groups.

In *E. ovis* the testes are lateral to the ventral sucker. It is not described here.

Considering the local material from the pancreatic and bile ducts of the ox (*Bos indicus*), I have found no difference in that from the two organs. I have a complete series of 53 specimens, ranging in size from 1·55 by ·48 mm. to 10·5 by about 5 mm.

Figure 1 shows one of the smallest forms, drawn with a Leitz drawing apparatus and reduced. It is at once apparent that the small forms are quite immature. They can only be associated with the rest of the material by the fact that they are in the series in which development can be traced by stages to that of the adult forms.

In the smallest specimens only the suckers, cæca and the centro-posterior longitudinal excretory duct can be made out. In specimens between 2·11 by ·354 and 2·64 by ·84 mm. the remainder of the excretory system can be seen, and, in some of the larger of these, columnar groups of cells mark the sites of some of the uterine coils

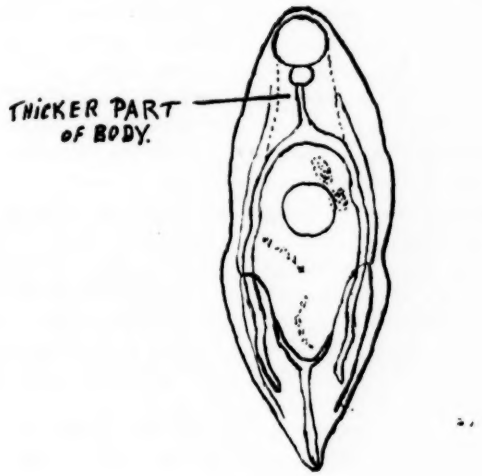

Fig. I.

Eurytrema Pancreaticum.

Immature Form.

No. 5. 2·16 × 75 mm.

and of the cirrus sac. In another specimen measuring 2·64 by ·55 mm., some 170 ova were present, the testes and ovary were not visible but the vitelline glands and cirrus sac were, the last extending to the level of the middle of the ventral sucker, but to one side of it.

Specimens measuring 2·74 by 1·54, 2·78 by ·5 and 3·02 by ·54 mm. showed the testes as well. Full maturity seems to be reached about the size of 3·076 by ·528 mm., in which for the first time many uterine coils can be seen anterior to the level of the ventral sucker. The ovary is also visible.

Considering this material in the light of the table of specific differences, the first point is that of size. I have in my series fully mature specimens below the range given for *E. dajii* and also some above it, connecting with the range given for *E. pancreaticum* and going also considerably beyond the minimum. Six specimens from the duodenum of a local ox ranged in size from 4·46 by 2·24 to 7·8 by 4 mm.

Taking the next character, that of the cuticular scales, it is a known fact that in many flukes which possess these scales they are lost through age. I cannot see that this point is of much value, when the scales are said to be absent in the larger and older specimens—just as one would expect.

The next feature is the difference of the level of the posterior end of the cirrus sac and the anterior border of the ventral sucker, which two levels are supposed to be well separated in *E. dajii* and not in *E. pancreaticum*. My smallest specimen showing this separation is 4·01 by 1·75 mm., others which show it are 4·67 by 2·53, 4·75 by 1·58 and 6·67 mm. Of 30 specimens within the size range of *E. dajii* 25 showed the *pancreaticum* arrangement, two that of *dajii* and in the other three the two levels were the same. Of nine over the size range of *E. dajii* but below that given for *E. pancreaticum* (*i.e.*, 8 mm.) four showed the arrangement supposed to be typical of *E. dajii*. During the progress of this work I happened

to notice that more specimens showed separation if collections were performed slowly and, by experiment, I ascertained that, if the flukes were allowed to die in water, wide separation could be produced in about a third of them, instead of about a tenth in control material killed as soon as possible in hot alcohol. The separation of these two structures, then, depends partly upon size and partly upon the technique employed.

Grouping of the vitelline glands. The difference in this respect is, according to Bhalerao, very small and it remains only to say that the grouping described by him, unsupported by any other writer whose work is accessible to me, cannot be confirmed. The size of the follicles in relation to the size of the flukes differs much and so their proximity differs. In some flukes where the follicles happen to be small they appear in elongated groups arranged along the branches of the vitelline ducts, but the arrangement is quite haphazard and differs on the two sides of the same individual.

Opening of Laurer's canal. It is difficult to find the canal, not to speak of seeing the opening! To me a character like this is of little use in classification, because the cutting of serial sections is necessary to show it. Two out of about 50 specimens examined with this point in view, 5·13 by 2·95 and 5·95 by 2·38 mm., appeared to have an external opening to this canal. I cannot, however, say definitely that they were true openings.

A few of the flukes in my material were much narrower than the average. The proportion of width to length is usually from 1 : 1·6 to 1 : 3·3, but the narrower ones showed proportions of from 1 : 5·5 to 1 : 5·8. There was, however, no other difference observable and one other specimen gave a figure of 1 : 4·8. It seems possible to create a series to connect the two forms quite closely. In my view it is useless to separate this form as a valid species based upon only one inconstant character. There is too great a tendency to create new species from the examination of a small amount of material.

Anatomical anomalies. While in both *E. pancreaticum* and *E. dajii* according to description there should be no overlapping of the uterine coils laterally over the cæca, I have observed that it does occur, although rarely. In one—an extreme case—on the one side four and on the other seven coils overlapped behind the level of the vitelline glands.

In another specimen there were no vitelline glands on one side of the body and in yet another both testes were smaller than the ovary.

I have material from the pancreas of a goat, collected in Ipoh in 1927 by Mr. Thiagarajan. It unfortunately, became mouldy, with the result that some of the 17 specimens were completely opaque and others were so in patches. In all the specimens, however, in which the point could be examined the uterine coils overlapped the cæca laterally behind the level of the vitelline glands. The ovary was large, being about the same size as the testes, and there appeared to be other smaller differences. The material suggested that the specimens had been killed in cold alcohol, as there was a good deal of distortion. For this reason, combined with the facts that the material was small in amount and partly damaged, it would be unsound to describe this as a new species as there is a possibility that it is *E. pancreaticum*.

Shrinkage on clearing in glycerine. This is often considerable. Three large specimens were measured, placed in water, then in alcohol, and then in glycerine for similar periods, and then remeasured, to clear up the point. It was found that there was a total average shrinkage of approximately 23·6 per cent. in length and 29·6 per cent. in width when so treated.

Summary.

In Malaya the differences in size between *E. pancreaticum* and *E. dajii* run imperceptibly into one another.

Observations are advanced by the author to show that the other characters relied upon by Bhalerao in establishing the latter species are inconstant and otherwise unreliable.

The author therefore considers that *E. dajii* is merely a synonym of *E. pancreaticum*.

There may exist a new species of *Eurytrema* in Malaya in the pancreas of the goat, in which there is a constant lateral overlapping of the uterine coils across the cæca posterior to the vitelline glands.

The immature stage of *E. pancreaticum* is figured.

It is pointed out that a large shrinkage occurs when flukes of this genus are cleared in glycerine.

References.

Baylis 1929. "A Manual of Helminthology," pp. 16-18.

Ware 1923. *Jl. of Comp. Path. and Ther.*, xxxvi, 2, 37.

Bhalerao 1924. *Ann Trop. Med. and Parasit.*, xviii, pp. 139-156.

Hunting with Drugs.

The New York Correspondent of *The Times*, writing to his paper on May 12th, says:—

"An expedition under Captain Harry Carpelan will soon set out from New York to hunt rare animals in Borneo, Indo-China, and other Oriental countries with guns loaded with darts carrying cocaine, morphine, or other anæsthetics.

"According to Captain Carpelan, who was formerly in the Russian Imperial Army, and has since had much experience as a big-game hunter, such darts, regardless of where they hit an animal, produce complete anæsthesia in less than five minutes, and thus make it possible to capture the animal alive. The victim is said to be none the worse for the experience.

"One of the difficulties of the scheme is that different animals react differently to drugs, and what will make a dog unconscious will merely infuriate a member of the cat family. Because of the danger of using the wrong ammunition in an emergency, rifle carriers will accompany the hunters, who are to employ the shot-guns loaded with the drugged darts."

The Committee dealing with the proposed memorial to the late Duke of Northumberland has decided to aim at raising a fund of £8,000 and to call it "The Alan, Duke of Northumberland, Agricultural Research Fund."

The committee adopted a resolution "That the interest on the fund be utilised for the purpose of advancing the study of agricultural science, and that if the income is insufficient it should be devoted in the first instance to research in sheep husbandry, precedence being given to the investigation of sheep and lamb diseases."

Clinical and Case Reports.

Lactation Tetany in the Cow.

By William Lothian, M.R.C.V.S., Duns.

Since the recognition of milk fever as an acute calcium deficiency, considerable attention has been focussed upon diseased conditions associated with lactation and parturition in the cow, and it is the purpose of this paper to record the occurrence of a disease in the lactating cow, since I am unaware that it has been recorded in the literature.

I first recognised the disease in 1922, and since then it has increased in my practice, both in its incidence and its extent: I have encountered 21 cases since October.

Conditions of Occurrence.

Breeding cows upwards of three years old, as distinct from dairy cows, are most commonly attacked, and the disease occurs during any period of lactation in cows which may or may not be pregnant.

The cases occur during winter and in the early spring months, and the affected animals are always in parks, especially old pasture grazings. In my experience, the affected animals have been cows lying out or housed by night in cattle courts.

Symptoms.

The onset appears to be sudden, and the course is short and acute. The symptoms are those of intense tetany. The animal is soon unable to retain her stance, and lies on her side; the head is retracted; the limbs rigidly extended; spasmodic twitchings of the facial and other superficial muscles, and purposeless, convulsive movements of the limbs are also observed. Death takes place in paroxysm in the course of a few hours.

This is the usual type, but some sub-acute cases run a course covering three or four days. In the less severe cases, the animal presents symptoms very similar to those of milk fever.

Because of the number of cases which have been found dead upon my arrival, I have carried through routine examination for anthrax, with negative result.

Post-Mortem Findings.

The evidence furnished in *post-mortem* examinations has been of an entirely negative character.

Since the syndrome suggested that of acute calcium deficiency, it was highly desirable that analyses of the blood should be made. I experienced difficulty in obtaining blood samples, since in so many cases the animal was dead upon my arrival. One sample of blood was, however, forwarded to Dr. Russell Greig at the Moredun Institute, and an analysis by Dr. Dryerre revealed the fact that the calcium concentration was very low. Because of this finding, and in view of the clinical symptoms of tetany, I resolved to treat my next cases by the recognised methods for milk fever.

In one case, calcium gluconate alone, in a dose of 250 c.c. of the ampouled solution, was injected subcutaneously. The animal rose in about three hours and walked to the farm steading. Recovery was uneventful.

In a second case the udder was inflated, and two ounces of calcium gluconate granules were injected in five per cent. solution, subcutaneously. This cow also recovered, although dulness persisted for a day or two.

In three other cases the treatment failed to produce any beneficial effect, but these were *in extremis* and died shortly after the treatment was applied. Indeed, one of the chief difficulties which confronts the practitioner is that the attack is so acute and so rapidly fatal that there is little or no time in which treatment can be applied.

I recognise that these two successful cases are not in themselves sufficient to permit of the treatment being confidently advised as a general procedure, but in view of the high mortality which the disease has occasioned in my district, I venture to publish my experience in the hope that other practitioners may report upon their findings.

It is obvious that the disease represents an acute metabolic disturbance, and I hope to have further analyses made at the Moredun Institute as opportunities present themselves.

Carcinoma of the Conjunctiva in a Cow.

By F. C. Heathcote, M.R.C.V.S., Bridgnorth.

A week ago (April 30th) I operated upon a four-year-old cow's eye for suspected carcinoma. The owner said that the cow had been flicked in the eye by a drover's stick; however, I suspected the condition to be a malignant growth. The eyeball was completely encapsuled by the growth, for its margin involved the conjunctiva, and it was about the size of an orange.

The animal was anæsthetised with two ozs. of chloroform and the eyeball, with its appendages, was completely enucleated. I have seen the cow twice since the operation and she appears to be going on satisfactorily.

I sent the pathological specimen to the Cancer Research Fund, London, as a matter of interest, and the reply is that the specimen is a squamous cell carcinoma of the conjunctiva; there being great infiltration, also destruction of the eye. Perhaps, however, this is not an uncommon case?

Deficiency Disease.

By Hamilton Kirk, M.R.C.V.S.

I was recently called to examine two young kittens of about five weeks old, and found them quite unable to stand without falling down in a second or two, and even unable sometimes to maintain a sitting posture. They would try to sit up in their box and look around when anyone approached, but usually they would roll over and remain prone where they fell. Quite often, the head would be thrown back stiffly and the legs stretched out, just as one would observe in cases of opisthotonos.

They made no attempt to feed from a saucer and I was told that they were given little opportunity by the queen of suckling her. Even when they were lying with her I presume they were unable to support or balance themselves sufficiently to enable them properly to feed.

The queen had little milk, so the owner decided to feed the kittens artificially. She accordingly fell into

the error so frequently made by inexperienced people, and proceeded to administer cow's milk *diluted with water*.

It seemed easy to diagnose that the nervous and muscular prostration resulted from sheer starvation not only in the quantity but in the quality of food consumed. I removed the kittens to my home, gave them a clean warm box in a sunny position, injected each of them with 1 c.c. colloidal vetostelin (calcium with vitamin D) daily for nine days, gave one eggspoonful cod liver oil on alternate days, fed them with milk and cream and shredded beef, and placed them in the actual sun's rays on every possible occasion. After the first week they began to improve, and by the tenth day they could climb out of the box, walk about the floor, played with string, etc., and were taking food voluntarily.

Feline Enteritis.

By Hamilton Kirk, M.R.C.V.S.

A four-year-old entire tom-cat, habitually in the wars from over indulgence in love making, was admitted with an apparent abscess over the left temple. Under chloroform he was castrated, and the swelling over the eye was opened. It contained no pus, however, but the necrotic contents were curetted away, and the wound gave considerable trouble in the ensuing days.

Just when the cat seemed well enough to return home, he commenced vomiting and became rapidly emaciated as the hours went by. Appetite was at once lost, the emesis was continuous and hæmorrhagic enteritis set in. The putrid stools were extremely fluid, partly gelatinous, and often considerably charged with blood. The cat was seriously ill within two days and I thought he would die. Every attempt at forcible feeding caused such vomiting, resistance, and exhaustion that I gave up trying. But I adopted another method, which I feel sure was the means of keeping body and soul together. This was the subcutaneous injection every 12 hours of nine ozs. of physiological saline and glucose solution, at blood heat, as suggested by Dryerre of Edinburgh, and as advocated later by Blount. The contents of one tablet are :—

Sodii chloride, grs. 40; Pot. chloride, grs. 1·9; Calc. chloride, grs. 1; Sodii bicarb, grs. 7·10; Neutral sodium phosphate, gr. 1; Glucose, grs. 5. Prepared by Messrs. Parke Davis & Co.

This, when dissolved in 10-ozs. water, makes an isotonic solution similar in composition to that of the blood plasma. As previously stated, nine ozs. of this solution were injected, and the remaining ounce was given *per os*.

Readers of the *Veterinary Record* may have heard of the somewhat inexplicable success reported by a few veterinary surgeons in the prevention and treatment of feline enteritis by the use of hæmorrhagic septicæmia vaccine as made by Messrs. Parke Davis & Co. There seems no connection whatever between the two diseases and nobody has attempted to explain why this vaccine should have any beneficial effect in feline enteritis. However, I had long before decided to use it in suitable cases as an experiment, and I gave this cat 1 c.c. every three days, giving three doses in all. No treatment other than the injections of saline-glucose and this vaccine was adopted and in 10 days the stools had become fairly normal, and the cat willing to eat sardines.

To-day, 16 days after the onset of symptoms, the cat is well and only needs feeding up, although he once was at death's door.

Abstracts.

[**On Disturbances in the Mineral-regulating Mechanism in Diseases of Cattle.** Sjollema, B., and Seekles, L., Utrecht Univ., *A. Biochem. Zschr.*, 1930, vol. 229, Nos. 4-6.]

The authors here publish the results of their work on the disturbances in the metabolism of the blood minerals which occur in milk fever and grass tetany (Kopziekte, Kopfkrankheit), and compare the relationships of the minerals with the normal values.

The symptomatology of these two diseases is described and compared for differential diagnosis purposes.

Blood serum was examined for an estimation of total Ca., Mg. and inorganic P, the diffusibility of the above tested by ultrafiltration and Ca. ions estimated in the ultrafiltrate. K., Na. and Cl. were only examined in a few cases, as no marked variation was found in them. Technical methods, which have been described in detail elsewhere, are only mentioned briefly in this paper. The results of the work are recorded in tables and in triangular graphs which show the relation between total Ca., P. and Mg., the sum of these three, the relation between Ca. ions, Mg. and P. in ultrafiltrate, and the sum of the latter. The comparison between the values of these substances in healthy cows and in those affected with milk fever and grass tetany is seen at a glance.

(1) The relation between total Ca., inorganic P. and Mg., as well as their sum, is constant in normal cattle. (2) In milk fever these relations and the sum are far from normal and very different from those of grass tetany. In milk fever there is more Mg. in relation to Ca. than normally and in grass tetany there is less Mg. to Ca. than normally. The relation Ca. : P. is constant in normal cattle, is very varied in grass tetany, and is less varied in milk fever.

The following table shows the average values in Mg. per cent, of the three conditions :—

	Normal.	M.F.	G.T.
Total Ca.	9·35	4·35	6·65
,, Mg.	1·66	2·19	0·455
,, P.	4·57	2·16	4·33

The ultrafiltration figures are still more striking. They average (in Mg. per cent.) :—

	Normal.	M.F.	G.T.
Ca.	1·65	0·44	1·09
Mg.	1·24	1·8	0·27
P.	4·6	1·54	4·10

The Mg. value shows the widest variation between milk fever and grass tetany, but whether the low Mg. value is a cause of grass tetany, the authors consider doubtful, as in tetany due to parathyroid deprivation in man, the Mg. content is normal, as is also the case in parathyroidectomied dogs. Perhaps the relation between Ca. and Mg. is important.

It is known that a high Ca. value is associated with great nervous activity and that narcosis requires a full blood content of Mg. (10-12 Mg. per cent.), which condition is favoured by the further removal of Ca. by the administration of oxalates, and terminated at once by the addition of Ca. salts to the blood.

The relation Ca/Mg in the normal animal is $\frac{9{\cdot}35}{1{\cdot}66} = 5{\cdot}6$.

" " Ca/mg in the milk fever animal is $\frac{4{\cdot}35}{2{\cdot}19} = 2{\cdot}0$.

" " Ca/mg in the grass tetany animal is $\frac{6{\cdot}65}{0{\cdot}445} = 14{\cdot}6$

The success of $Mg.SO_4$ therapy in tetanus is in agreement with these figures. It would appear, then, that the clinical picture of milk fever and grass tetany depends upon the relation between Ca. and Mg. and not on the values of these substances taken singly.

As Wacker has shown, the Ca. and, more particularly, the Mg. content of the blood serum is dependant on muscular work, therefore it is important to know the condition of the muscles immediately before taking the blood sample. This was verified by the authors in a study of 39 cases of grass tetany, in which they found an appreciable difference between the Mg. content according to whether the blood sample was taken during a tetany attack, shortly after, or a longer time after such an attack, the value of Mg. in mg. per 100 c.c. of blood serum being in the proportion of 2 : 3 : 4 respectively for the above conditions (0·4 mg. per cent. : 0·6 : 0·8 mg. per cent.). Individual variations encountered are discussed by the authors.

Now as regards the ratio Ca. : P. In cases of latent tetany it has been found that the value of Ca./P. is 1·0 or even less. The authors found in their cases of grass tetany an average value of Ca./P. of 1·5 and in milk fever the figure is about 2·0. As a general rule it may be taken that a small figure is associated with tetany, yet the authors mention a few cases of tetany attendant on various primary causes in human beings in which the Ca. : P. was as high as 4 : 1. Perhaps the proportion of Ca. : P. is not etiological but symptomatic in origin.

The proportion of P. : Mg. is, however, of significance in milk fever and grass tetany : in the former it is 1 : 1 and in the latter 10 : 1.

The relation between $\frac{Na.+K.}{Col.+Mg.}$ is discussed briefly, but the authors have been unable to attach any importance to it in these two diseases.

The Ultrafilterable Parts of Ca., Mg. and Inorganic P. in Bloodserum.

The figures for three conditions are given as follows and represent average values in Mg. per cent.

	Total Ca.	Percentage diffusible.	Ultrafiltrate Ca.	Ca. ions.	Total Mg.	Percentage diffusible.	Ultrafiltrate Mg.	Total P.	Percentage diffusible.
12 normal cows ...	9·35	56	5·23	1·65	1·66	75	1·24	4·6	100
10 cases milk fever ...	4·35	56	2·36	0·44	2·0	80	1·44	1·54	100
18 cases grass tetany ...	6·65	66	4·19	1·09	0·4	68	0·27	4·10	100

Actually, the percentage of Ca. varied much in individual cases—48-66 in normal animals, 25-100 in milk fever, and 40-100 in grass tetany. No connection was found by the authors between the percentage of diffusible Ca. or Mg. and the occurrence of tetany or the coma of milk fever. Concerning the supposition of Rona and Takahashi that the serum content of Ca. ions depends on the hydrogen ion and carbonic acid concentration, the authors cannot support this view, and state their opinion thus : " We would like to declare that we do not consider that the disturbances in the mineral relations in the blood serum, which occur in the two syndromes, are primary."

They consider that grass tetany is caused by a poison which is formed in the intestine, perhaps originating from the component parts of the food. The poison unbalances the regulating mechanism. It is mysterious, however, why only one or two animals out of 20 may become affected.

J. T. E.

The Minister of Health and the Secretary of State for Scotland have appointed a Committee to enquire into the working of the law as to the composition and description of articles of food other than milk, and to report what alterations, if any, in the law or its administration appear to be desirable.

[**Equine Tuberculosis : Literary, Clinical and Experimental Study.** Schmidt, J. 1930. *B.T.W.*, xxxxvi, pp. 756-765.]

After reviewing the previous work, the author describes in great detail 12 cases observed by him and gives an account of the clinical picture, blood examination, allergic reaction, pathological anatomy, etiology and pathology of equine tuberculosis. According to the latest report of meat inspectors in Saxony, ·43 to ·46 per cent. of slaughtered animals have been found to be affected, while similar figures for Germany and Switzerland represent an average of ·14 to ·40 per cent. respectively. Actually, the disease must be of more frequent occurrence. As the clinical picture is not characteristic, the diagnosis is best established by bacteriological examination, failing which the intrapalpebral tuberculin test gives unerring results. Lungs are mostly affected ; of other organs spleen, mesenteric lymphatic glands and liver may become affected. There is a tendency to arterio-sclerotic processes accompanied by the formation of thrombi in blood vessels, and tuberculosis of bones and skin is of frequent occurrence. There is not the slightest doubt that horses can be infected by all three types of tubercle bacilli—human, bovine and avian. In the horse the infection occurs in a more malignant form than in cattle (although there are many instances

on record in which the disease ran an insidious course) and cases of tuberculosis in foals occur but seldom. Prophylaxis on orthodox lines is advocated. The paper has a list of 137 references appended.

H. F.

[**The Relationship between the Parasitic Aneurism of the Horse and the Origin of certain Diseases.** Koeppen. 1930, *B.T.W.*, xxxxvi, No. 41, pp. 778-780.]

Aneurisms of parasitic origin (*Sclerostomum armatum*) accompanied by thrombosis occur in 90-95 per cent. of cases in the region of *Art. mesent. ant.*; those occurring in *Art. coeliaca, Art. mesent. post., Art. renalis,* and in the abdominal aorta have been found in 1·5 to 4·5, 2 and 3 per cent. of cases respectively. Many cases of colic in horses can be directly traced to the presence of parasitic aneurism in the intestines. In this connection, torsion and volvulus of the colon and cæcum, and the etiology of intussusception are discussed. Many cases of lumbago and of paralysis of the hind extremities may be traced to emboli originating in parasitic aneurisms. Bollinger's Dieckerhof's and Hutyra and Marek's works are cited *in extenso,* and some of the cases seen by the author in his own practice are described. Further research into the ætiology of colic simulating diseases of the horse is advocated.

H. F.

[**New Results from the Field of Research and Control of Strangles.** Richters. *B.T.W.*, xxxxvi, No. 42, pp. 793-796.]

Etiologically *Str. equinus* is responsible for the disease. The infection may be introduced through abrased skin, mucous membrane, *per os,* with food and drinking water, and even by sexual act. The tenuity and viability of the causal agent must be closely studied so that disinfection and prophylactic hygienic measures become effective. The organism is very resistant to the action of and preserves its viability in, water, withstands drying for quite a long time, and its chemo-resistance is very high. Therefore, attention has been recently centred on immunisation. Passive immunisation, even with the highly potent polyvalent serum produced no desired effect. Simultaneous inoculation—highly potent hyperimmune polyvalent serum, in combination with methylene blue vaccine—reduced losses by 50 per cent. and seemed to prevent the occurrence of metastases and untoward sequelæ. The author attributes the heavy losses that sometimes occur in some strangles epizootics to the fact that we possess no sure means for the early diagnosis of the disease. A plan of campaign for the systematic control of the disease is described in great detail.

H. F.

The new regime in Spain is to foster Spanish agriculture. All waste land is to be cultivated and it is expected that ere long all the lands formerly used exclusively for hunting will be included in the area which is to be cultivated. Force will be used if necessary.

Dairy Shorthorn breeders are making a strong effort to win the Bledisloe Cup this year at London Dairy Show. Steps have been taken to select a representative team. Numerically the Shorthorn is by far the most important dairy breed.

Victoria Veterinary Benevolent Fund.

A meeting of the Victoria Veterinary Benevolent Fund was held at 10, Red Lion Square, London, W.C.1, on Wednesday, April 8th, 1931, when there were present:—Lieut.-Colonel J. W. Brittlebank (President), in the chair, Mr. G. H. Locke, Major-General Sir John Moore, Lieut.-Colonel P. J. Simpson (Hon. Secretary), Messrs. A. Spicer, J. Willett, Professor G. H. Wooldridge, and Lieut.-Colonel T. Dunlop Young.

The minutes of the previous meeting held on January 7th, 1931, having been published, were taken as read and signed as correct.

Apologies for absence were received from Mr. A. Gofton, Major F. L. Gooch, Sir Ralph Jackson, Mr. J. Ewing Johnston, Major C. W. Townsend, Captain S. Villar, and Mr. W. Jackson Young.

Secretary's Report.

The Secretary submitted the following report for the quarter:—

New Subscriptions.

	£	s.	d.
Anonymous	1	1	0
Captain W. Hay	1	1	0
Mrs. M. Simpson	1	1	0
	£3	3	0

Donations.

Collecting Boxes.	£	s.	d.
D. Brown	0	7	6
Central Veterinary Society	5	19	6
Captain H. Gillmor	1	11	6
North Wales Division, V.M.A. ...	0	16	6
	8	15	0
Midland Counties V.M.A.	5	0	0
North of England V.M.A. (proceeds from Bridge and Whist Drive)...	50	4	1
Lieut.-Colonel P. J. Simpson (proceeds from "Happy Ending")	98	0	6
Mark Tailby	1	1	0
	£163	0	7

"The contribution from the North of England V.M.A. represents the proceeds of an effort made by the Ladies' Committee, of which Mrs. J. H. Taylor was Chairman and Mrs. J. W. Rider, Secretary. A bridge and whist drive was organised for the day of the Annual Meeting of the Association. In addition, a cut-glass bowl, given by Mrs. W. A. Doughty, of Alnwick, a cake given by Mrs. F. T. Finney, of Newcastle, and a pair of Australian love birds by Mrs. F. Pickering were either raffled or sold, and realised £14 7s. 0d. Mrs. J. H. Taylor made a collection amongst her own friends and made a contribution of £20. Smaller donations and cash takings amounted to £15 19s. 1d., making a total contribution to the Fund of £50 4s. 1d., or more than double the amount raised by the Ladies' Committee in the previous year. As the North of England V.M.A. give a regular annual subscription of £5 5s. 0d. in addition to these special efforts, they set a very high example to other Associations, and

the most cordial thanks of the Fund are due to all who helped in this work.

" It will be seen, too, that the Dramatic Entertainment organised by Colonel Simpson resulted in a contribution of £98 0s. 6d. being made to the Fund. It would be proper to add to this amount the sum of £8 2s. 0d. received from Mrs. Simpson a short time earlier, as showing that the total contribution from our Hon. Secretary and his wife and their co-workers is over £106. Again the appreciative thanks of the Council are due for this very acceptable addition to our Funds."

It was resolved " That the Secretary's report be approved and that the most heartfelt thanks of the Council be conveyed to the Ladies' Committee of the North of England V.M.A., and to Colonel Simpson and his friends, for their fruitful labours on behalf of the Fund."

Annual Report.—A draft Annual Report was submitted and approved for issue to the members prior to the Annual General Meeting.

Review of Cases.—The following cases were reviewed. —No. 10, widow, aged 69; No. 62, widow, aged 69; No. 93, widow, aged 69.

The recipients in each case being now entitled to the Old Age Pension, it was decided to discontinue the grants.

Cases.

No. 19, widow, aged 68. Two adult childen. The Secretary reported that this recipient had recently had a small legacy and it was resolved to discontinue the grant for the present.

No. 72, widow, aged 54. Three children, two married. A report was received on the financial circumstances of this application and discontinuance of the grant was decided upon.

No. 152, widow, aged 53. Earns 10s. to 12s. p.w. as charwoman. Pays 6s. for room, 4s. for coal, light, etc. No income. A grant of 10s. p.w. was made in this case.

No. 153, widow, aged 53. Daughter aged 15 at school. No income beyond receipts from letting of rooms. A grant of 10s. p.w. was made in this case.

No. 154, wife of member, aged 74. Husband in mental hospital. Only income, Old Age Pension. It was decided that the grant of 10s. p.w. formerly paid to the husband be transferred to the wife.

No. 155, Ex-M.R.C.V.S. The Secretary reported an application on behalf of this person, but no action was taken.

No. 150, Member, unemployed and without means. The Secretary reported that the Executive Committee had authorised him to provide this member with the cost of his railway fare to Dublin and a small additional allowance.

The action of the Executive Committee was approved and the question of further assistance was left in their hands.

No. 156, widow. Two children, ages 19 and 14. The Secretary reported that an application had been received from this widow who was seriously ill and had been unemployed for several months. She had no means and had two children to provide for. The President undertook to do what was possible to find employment for the elder boy, and the question of temporary relief to the widow was left in the hands of the Executive Committee.

Investments.—The Secretary reported the purchase of £300 three per cent. Local Loans at a cost of £204 6s. 0d.

N.V.M.A. Divisional Report.

Mid-West and South Wales Division.

Surgical Demonstrations at Bath.

The popularity of a programme of operations as the chief feature of a veterinary society meeting was borne out once again at Bath on Friday, April 17th, 1931, when the members of the Mid-West and South Wales Division gathered in force at the Cattle Market at 2 p.m. to witness the carrying through of the earlier part of the proceedings of the second meeting of the year.

This section of the afternoon's activities took the form of a surgical demonstration by Professor J. McCunn and Mr. C. Formston who, by their skilled and successful efforts to interest and instruct the company, materially increased the very large debt already owed by provincial practitioners to the Royal Veterinary College staff for their never-failing readiness to comply with the requests of divisional secretaries for co-operation in their endeavour to provide acceptable material for their members.

Fortunately for the convenience of the operators and the pleasure of the spectators, the threat of rain developed into little worse, and although the venue was perhaps better adapted to the large animal surgical demonstration which was staged there last year, than as a canine theatre, the series of demonstrations was carried through without a hitch. The list of subjects selected afforded a valuable demonstration of operative measures, a knowledge of which is demanded of any veterinary surgeon claiming to be regarded as an up-to-date practitioner of canine surgery.

The circumstances under which the operations were carried out, differing as they did so widely from the conditions prevailing at the College operating theatres, rendered particularly impressive the mastery of technique exhibited.

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The Wiring of an Injured Toe in a Greyhound.

By Professor J. McCunn.

The joint affected was the first inter-phalangeal of the third digit. The joint was considerably enlarged, being surrounded by fibrous tissue. An incision was made over the lateral aspect of the joint, the direction of the incision being in the long axis of the digit. This operation was repeated on the opposite side of the toe. The skin and subcutaneous tissue was dissected down to the fibrous tissue surrounding the joint. This tissue was incised and the bone exposed. A considerable quantity of synovial fluid escaped, revealing that there was a synovitis present.

The lower end of the first phalynx was now drilled transversely. This operation was repeated in the upper end of the second phalnx.

A piece of silver wire was now passed through and the two free ends fixed by twisting. The twisted ends were cut off, flattened, and then the wire was seen to be buried in the fibrous tissue.

The skin and subcutaneous tissues were closed by a single layer of interrupted silkworm gut sutures.

A dry dressing was applied, and the foot bandaged, with instructions to remove the bandage after three days.

. . . . .

Hysterectomy on a Bitch.

By Professor J. McCunn.

The subject was eight months old. Anæsthesia, which was perfect, was induced by the aid of morphia and chloroform. The abdomen was prepared by shaving and painting with iodine.

A small incision having been made in the midline, midway between the umbilicus and the pubis, the abdominal fascia was exposed and incised, revealing the rectus abdominis muscle.

The right and left recti were separated, revealing the transversalis abdominis fascia, to which the peritoneum is attached. This layer was now incised and the abdomen opened. Search was made with the index finger and a horn of the uterus was withdrawn. The other horn and the body were then exposed. The body was double clamped, severed between the clamps, and ligatured, and the ovarian end was operated upon in a similar manner. The broad ligament was now ligatured and the uterus removed. The ovaries in this case were left in the abdomen, the ovarian ligaments being very short and there being danger of rupture if they had been forcibly withdrawn. The abdomen was now repaired in three layers, catgut being used for the two deep layers, and silkworm gut for the skin. The wound was further protected by the application of a gauze pad, which was anchored by means of four silk sutures inserted in the skin after the manner of Lembert sutures.

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Speying of a Cat.

By C. Formston, M.R.C.V.S.

The animal was restrained and anæsthetised with chloroform. The left flank was shaved and painted with tinct. iodi mitis. The site of the incision was at a point equidistant from the crest of the ilium, the last rib and the lumbar transverse processes. A small skin incision was made and the external and internal oblique muscles were divided in the direction of their fibres, making a valve-like port of entry, *via* the peritoneum, into the abdominal cavity. Using a pair of artery forceps as a retractor, the wound was opened and one horn of the uterus picked up with dressing forceps.

The ovarian ligament was crushed with artery forceps and severed. This horn was traced back to the bifurcation and the other horn picked up and treated similarly.

Since the uterus was a relatively large one the body was ligatured, otherwise no ligature would have been used as in the case of the ovarian ligaments. Uterus and ovaries were removed. One suture was put in each muscle layer and three sutures in the skin wound.

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Removal of Fibromata from the Vagina of a Spaniel Bitch.

By Professor McCunn.

The vagina was almost occluded by the growths, of which there were two—one, approximately 3-in. by 2-in., being attached to the roof of the vagina, and the smaller one being situated on the floor.

The mucous membrane over the growths was incised with the help of scissors. A finger was introduced into this incision and by blunt dissection the membrane was separated from the growth. In the case of the large growth some difficulty was experienced owing to it being far forward and somewhat inaccessible. Retraction was effected by means of a large pair of forceps. In the case of the smaller growth, which showed evidence of some previous operation, scissors had to be used to complete the blunt dissection. Morphia was the anæsthetic used, and as a precautionary measure the vagina was packed with gauze.

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It was regretted that no animals were available upon which to perform the gland grafting operations. However, as some of the members present expressed a wish to see the technique of this operation, Professor McCunn demonstrated upon a recently-destroyed animal.

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The Business Meeting.

Leaving the Cattle Market, for the use of which they were indebted to Alderman Tom Stone, Chairman of the Markets Committee of the Corporation of Bath, the members hastened to the Red House Restaurant, where a brief business meeting was held.

The President (Mr. R. Moore) occupied the Chair, and the attendance book was also signed by the following:—Captain W. A. Austin, Captain J. J. Aveston, Captain J. R. Barker, Messrs. J. R. Baxter, E. C. Bovett, W. T. D. Broad, G. S. Bruce, Mr. J. C. Coleman, B. Gale, Major G. E. Henson, Captain J. R. Hewer, Captain J. Howard Jones, Messrs. T. Margarson, J. W. Hall Masheter, C. J. Pugh, W. D. Rees, W. M. Scott, G. H. Thomas, F. Tonar, C. Digby Watkins, W. R. Watson, W. Webster, H. C. Wilkins and M. E. Williams, with Mr. C. E. Perry, Hon. Secretary.

The following visitors were present:—Dr. J. McCunn, Mr. C. Formston, Major F. Chambers, Mr. M. L. Dartnall, Mr. W. F. Barton, Captain F. J. Eardley, Mr. A. Houston, Lieut.-Colonel W. A. Jelbart, Captain J. Richardson, H. W. Griffith.

The minutes of the previous ordinary general meeting (held at Bridgend), which had been published in the *Record*, were taken as read and were confirmed and signed on the proposition of Captain Barker, seconded by Mr. Margarson.

Arising out of them, the Hon. Secretary reported that, in accordance with the decision arrived at at that meeting, a letter had been sent, through Major Henson, to the Corporation of Bristol, in support of the appeal received by that body from the Chairman of the Board of Governors of the Royal Veterinary College on behalf of the Rebuilding Fund of that Institution. Mr. Perry also reported that, as instructed at that meeting, he had circularised all non-members of the N.V.M.A. within the area of the Division urging them to join the parent body. He was surprised to find that they numbered over a hundred, and he was pleased to be able to report that, as a result of the steps taken, four new members were obtained for the "National." (Applause.)

Correspondence.

(1) From Mr. T. J. Brain, Mr. R. W. Hall, Major D. M. Storrar and Captain W. P. B. Beal (who informed the Hon. Secretary that he had taken an appointment as

veterinary surgeon to the new zoological park at Whipsnade) apologising for their inability to attend the meeting.

(2) From Mr. C. V. Watkins, who had left Bristol for the Pasteur Institute, Paris, resigning his membership. Mr. Watkins' resignation was accepted, with regret.

(3) From Major E. E. Seldon, intimating his inability to serve on the Council of the Division, to which he had been elected at the January meeting On the proposition of the Hon. Secretary, seconded by Captain Barker, Mr. T. Margarson was elected to fill the vacancy.

(4) From the Secretary, N.V.M.A., enclosing and supporting a communication from the Secretary, R.C.V.S. (also read) urging the discontinuance, on the part of any members of the profession who might be pursuing it, of the reprehensible practice of inserting, on their notepaper and account forms, letters other than those indicative of the possession of a professional or academic qualification.

The meeting expressed hearty approval of the recommendation.

Finance.—The Hon. Secretary brought to the notice of the meeting a matter concerning the finances of the Division, which it was eventually decided to leave, for consideration and report to Council, in the hands of a committee consisting of the Hon. Secretary, the Hon. Treasurer and Captain Aveston.

A Benevolent Fund Recommendation.

The next business before the meeting was to consider a recommendation of the Council: "That £100 be sent from the Benevolent Fund to the Victoria Benevolent Fund, for investment, to be called 'The Adams Memorial Fund.'"

The President said that he begged to propose a Resolution to that effect.

The Hon. Secretary said that, before that Resolution was put, he would like to inform the meeting that he had received from Mrs. Adams a letter in which she stated that, needless to say, she was exceedingly gratified to think that it was the intention of the Mid-West and South Wales V.M.A. to act in the manner proposed, and conveying her warm appreciation and thanks.

Captain J. J. Aveston observed that, as one who had been largely associated with the late Mr. Adams in establishing the Division's Benevolent Fund, he had great pleasure in seconding the President's proposition. He was sure that the course proposed would have commended itself warmly to Mr. Adams; they could well afford to do it, and it would be a kindly act of remembrance towards their dear old friend, who did so much both for the Association and for the Benevolent Fund.

Mr. W. R. Rees heartily supported the proposition, adding, however, that he would have supported it yet more gladly if the amount it was proposed to send to the "Victoria" were larger. He did feel that the Society could not pay a more fitting tribute to the memory of the late Mr. Adams than by taking a step which would associate his name in perpetuity with the Victoria Veterinary Benevolent Fund.

Mr. M. E. Williams proposed, as an amendment, that the amount to be sent be doubled.

The amendment was seconded by Mr. J. C. Coleman and supported by Mr. J. R. Hewer.

In reply to a member, Mr. Rees informed him that, if the amendment were carried, the sum of £75 would be left in the Division's Benevolent Fund. The Hon. Secretary expressed disapproval of a course which would so materially reduce the amount standing to the credit of the local Fund. Mr. Adams' idea, in inaugurating it, had been that there should be built up a substantial source from which relief could be given to members of the Society or their depeadnts who might be in need of it. They had had a striking and moving illustration of the value of the local Fund in that connection only a few years ago.

Mr. Rees observed that the fact was that the whole of the money in the local fund was obtained through the medium of the late Mr. Adams and he thought they could well do something in the future to increase the £75 which would remain if, as he hoped, the amendment was carried and the substantial sum of £200, instead of lying idle, were to be made immediately available for the relief of very urgent and distressing cases now inevitably being denied adequate help owing to the lack of financial resources of the Victoria Veterinary Benevolent Fund.

The President, who spoke in support of the Council's recommendation, now put the amendment to the meeting.

The amendment was lost, and the recommendation of Council carried.

Nominations.—The following gentlemen were nominated as members of the Division: Lieut.-Colonel W. A. Jelbart (Dursley), proposed by Mr. Watson, seconded by Mr. Hall; Mr. A. O. McDowell (Gloucester), proposed by the Hon. Secretary, seconded by Captain Aveston, and Mr. E. G. Morris (Ministry of Agriculture, stationed at Hereford), proposed by Captain Barker, seconded by Mr. Hall Masheter.

Next Meeting.—Decision as to the place of next meeting was left in the hands of the Council, with Hereford as a recommendation.

Vote of Thanks.—The President proposed a hearty vote of thanks to Dr. McCunn and Mr. Formston for their kindness in journeying to Bath and performing the most instructional and interesting operations they had witnessed that afternoon. The vote of thanks having been accorded with acclamation, Dr. McCunn, on behalf of Mr. Formston and himself, acknowledged the compliment and expressed gratitude for the very kind reception given them by the members of the Division.

The members enjoyed a social hour over the tea tables before separating.

C. E. Perry, *Hon. Secretary.*

There was exhibited recently at the General Electric laboratories at Schenectady an X-ray tube of a power far beyond that of any other yet devised. Within the tube electrons were discharged at a speed of 184,000 miles a second, or 99 per cent. of the speed of light, under the pressure of an electrical current of 900,000 volts. In spite of the fact that the X-ray represented only two-tenths of one per cent. of the energy flowing between the cathode and the target—the remainder being lost in the form of heat—the ray penetrated, first a protective layer of copper, three millimetres thick (about $\frac{1}{8}$-in.), then 4-in. of iron, and was still powerful enough to take an X-ray picture.

The tube, which was made by Dr. W. D. Coolidge, associate director of laboratories, will be used in the Memorial Hospital, New York, for treatment of cancer. Its power is equal to that of an enormous amount of radium.—*The Times.*

County Councils Association and the Royal Veterinary College.

At a meeting of the Executive Council of the County Councils Association held on April 29th, 1931, the Report of the Agricultural Committee, which was adopted, contained the following :—

The Committee had before them the following letter received from the Ministry of Agriculture in reply to the resolution (see *Official Gazette*, February, 1931, page 76) passed by the Committee at their last meeting upon the subject of Government aid to the Royal Veterinary College :

12th February, 1931.

" Sir,—I am directed to acknowledge your letter of the 7th instant forwarding a Resolution from the Gloucestershire Diseases of Animals Committee concerning the continuance of the Royal Veterinary College.

It would be a source of deep regret to the Minister if the College were compelled to curtail or cease its activities. As you are no doubt aware, the Government have promised a grant of £150,000, on certain conditions, towards the cost of a scheme of complete reconstruction of the College, and are further prepared to contemplate an increase of the present grant of £3,300 a year for the maintenance of the College after reconstruction. The Minister earnestly hopes that, with this aid, and such aid as the Governors may be able to obtain from other sources, the future of the College may be assured.

(Signed) H. E. Dale."

It appears, with regard to the promised grant of £150,000 from the Government, which is conditional upon £100,000 being raised by the College by private subscriptions and donations, that the sum of approximately £55,000 has already been received or promised. Some of the promises, however, are contingent upon the aforesaid sum of £100,000 being forthcoming. Thus an amount of approximately £45,000 has still to be found. In this connection, it may be pointed out that the Government are prepared to make a grant of £100,000 immediately, but it is the unanimous view of the Governors of the College that to embark upon a policy of rebuilding (which would ultimately cost £250,000) with little more than half of this sum behind them would be not only unbusinesslike, but probably disastrous. The Governors, in fact, feel so strongly on this point that, unless the full amount required is forthcoming by July, they intend to begin closing down the College.

The deplorable state of some of the buildings is illustrated by the fact that the London County Council have served notices on the College condemning parts of the structure as unfit for occupation. This has necessitated a very considerable amount of shoring up, and on the whole of one side of the building the upper storey has had to be removed.

The financial position of the College is anything but strong, an average loss of approximately £2,500 having been incurred in each of the last three financial years. This loss has been met partly by the realisation of assets and partly by private donations, and the liquid assets of the College have now been reduced to some £1,500.

Finally, it may be mentioned that a Departmental Committee, set up in 1928 by the Rt. Hon. Walter Guinness, M.P.—then Minister of Agriculture—to consider the question of the reconstruction of the College, reported that, in their view, its condition constituted a national disgrace, and they recommended rebuilding and re-equipping at an estimated cost (including the acquisition of the freehold) of approximately £300,000.

After a debate, in which Sir Merrik Burrell, Mr. Dent, Sir Henry Fairfax-Lucy and Sir Percy Jackson participated, on the motion of Sir Henry Fairfax-Lucy, seconded by Mr. Dent, it was resolved :—

(*a*) That the Minister of Agriculture be requested to receive a deputation from the Association for the purpose of discussing the position of the Royal Veterinary College :

(*b*) That it be left to the Chairman of the Council to appoint the members of the deputation.

Dogs that Worry Sheep.

Owners' Responsibility.

" Several weeks ago reference was made on the agricultural pages of *The Times* to the mischief done among flocks of sheep by dogs, and it was announced that rewards for the identification of offenders were being offered by some local branches of the National Farmers' Union," says the Kennel Correspondent to that paper, in Monday's issue. " Unfortunately, when a dog once contracts this habit he usually proceeds very craftily, confining his misdeeds to the darker hours in which he is not likely to be seen. He seems to know that he is committing a serious offence that places him beyond the pale. Frequently it happens that the miscreant is one who would be the least suspected, unless he takes home with him evidence in the form of blood on his coat. Sheepdogs, who would be the last to excite suspicion, are often guilty. People who live in rural districts should make a point of securing their dogs at night.

" A few breeds have worse reputations than others. Among the expenses of " walking " sapling greyhounds, coursing men usually have to allow for compensation to farmers. These dogs would transgress openly, their nature being to chase anything that runs, whether it is sheep or poultry. It does not do to chastise them when caught in the act, or they may shy at killing a hare.

" Ordinarily a man is responsible for damage done by his dog if it can be proved that he has knowledge of its propensity to commit whatever the offence may have been, but no such leniency is shown in the case of those that worry farm animals, including poultry and domestic pigeons. There the aggrieved person is under no obligation to show prior knowledge on the part of the owner. Damages may be recovered, and, under the Dogs Act, proceedings may be taken before magistrates, who may order the offender to be destroyed or kept under proper control as being " dangerous." It cannot be too strongly emphasised, too, that this Act makes the chasing of sheep an offence. How few people are aware of this important provision who take their dogs for country walks!

" The farmer, however, cannot take the law into his own hands. He may shoot a dog only if it is engaged in the act of worrying and cannot be prevented by other means. Similarly, a gamekeeper has no right to shoot a dog found trespassing in coverts. Should he do so he may have to pay heavy damages. Last year the Minister of Agriculture made an Order dealing with the control of dogs which gives local authorities power to make regulations for the control of dogs between sunset and sunrise. This may apply to all dogs or any particular class of dogs.

" If dogs once become addicted to sheep-worrying it is almost impossible to check them. When asked by owners, as I am sometimes, what they should do, I have to confess my inability to give any satisfactory advice. With puppies the matter is different. If they are put in the way of temptation and reprimanded severely on showing any disposition to chase sheep they can be taught decent manners. 'As the twig is bent, the tree's inclined.' There is not so much danger with regard to cattle, but poultry may be a source of trouble. It should be remembered that if a dog kills a hen, though it may not be worth more than a few shillings, the owner may find himself summoned for keeping a " dangerous " animal, and what happens then will depend upon the magistrates. A few weeks ago a puppy, getting into bad company, was concerned with two terriers in slaying a fowl, and the magistrates ordered that he should be chained in future. An effort was made to have him destroyed on the score that he was " dangerous." Though this may have been an extreme case, the possibility is always present that a dog may be punished heavily for what appears to be a trivial dereliction.

" In every way the desirability of having dogs well-mannered and under control outside is constantly being forced upon us, and, for their sakes as well as our own peace of mind, we should see that at least the elements

Notes and News.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

May 28th.—Last day for return of Voting Papers R.C.V.S. Council.

June 1st.—Meeting of the Editorial Committee, N.V.M.A., at 2 Verulam Buildings, Gray's Inn, W.C.1, 4.30 p.m.

June 4th.—**R.C.V.S. Annual General Meeting.** Victoria Veterinary Benevolent Fund, Annual Meeting.

June 4th.—Meeting of the Central Division, N.V.M.A., at 10 Red Lion Square, W.C.1, 6.30 p.m.

June 15th-20th.—D.V.S.M. Examinations.

July 2nd.—R.C.V.S. Annual Dinner.

Aug. 22nd-28th.—N.V.M.A. Congress at Norwich.

Personal.

Mr. H. J. Dawes Dangerously Ill.

As we go to press we learn, with deep regret and concern, that since the return of Mr. H. J. Dawes, F.R.C.V.S. (Hon. Secretary, N.V.M.A.) to his home at West Bromwich from Bournemouth—where he had been recuperating after an attack of influenza—he has become dangerously ill again, and that his condition is giving rise to grave anxiety.

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Mr. H. Llewelyn-Jones, M.R.C.V.S., has been unanimously elected President of the Rotary Club of Denbigh for the ensuing year, which commences on July 1st.

Army Veterinary Service.

Movements of Officers.

Captain H. Jerrom is at present in this country on leave from India.

Major G. A. Kelly is at present on leave *ex* India until July 3rd, inclusive; he joins the Aldershot Command for duty on July 4th, on reversion to the British establishment.

Obituary.

Death of Major B. A. Jarvis.

It is with deep regret that we have to announce the death of Major B. A. Jarvis, Royal Army Veterinary Corps, which took place in India on May 9th, 1931, from intestinal obstruction following on appendicitis, at the age of 45 years.

The deceased officer graduated in London on December 20th, 1907; was gazetted to the Royal Army Veterinary Corps in the rank of Lieutenant on September 9th, 1908; promoted Captain September 9th, 1913; Major on September 9th, 1923.

Major Jarvis served in France, Belgium, Egypt and Mesopotamia during the Great War; was awarded the 1914-15 Star, British War Medal and Victory Medal. He also served with the Egyptian Army in the Sudan, and the Order of the Nile, 4th Class, was conferred on him. Major Jarvis held the appointment of Deputy Assistant Director of Veterinary Services, British Army of the Rhine.

Major Jarvis leaves a widow, to whom all officers of the Corps tender their deepest sympathy in her sad loss.

Tuberculin-Tested Cows at Shows.

The question of restricting the London Dairy Show to animals which have passed the tuberculin test has again been discussed by the National Cattle Breeders' Association. The prime mover was the English Guernsey Cattle Society, on whose behalf a resolution was tabled. In the course of the discussion it was urged that while the segregation provided at the last Dairy Show singled out animals from herds licensed to produce Grade A (T.T.) milk or certified milk, there was no separate accommodation for cattle from tuberculin-tested herds which were not licensed for graded milk production. Moreover, the atmosphere of the Royal Agricultural Hall in Dairy Show Week must be conducive to the spread of any germs from affected cows. Finally it was resolved that "It is desirable that no animals should be accepted for the Dairy Show unless they have passed the tuberculin test." The decision rests, of course, with the British Dairy Farmers' Association, whose annual show this is. In present circumstances it seems improbable that such drastic safeguards could be enforced without seriously interfering with the full representation of the best of the country's dairy herds. Though the practice of using the tuberculin test regularly to oust unfit and suspected cows is growing, and particularly among the breeders of pedigree dairy stock, further progress is needed before the dairy industry can be represented solely by cows which have passed the tuberculin test.—*The Times*.

Congratulations to Highland Society.

"It is appropriate that the Royal (Dick) Veterinary College should be the first body to greet the Highland and Agricultural Society on the completion of a century of activity that has conferred ever-increasing benefit on the agriculture of Scotland," says *The Scotsman* of May 8th. "The Highland Society, as is well known, holds its 100th Show at Edinburgh next month, and the preparations for the event, which is to be fittingly celebrated, are well advanced. The presence of the Prince of Wales as president will lend distinction to a meeting which will rank as the greatest in the history of the Society. While appreciating to the full the incalculable value of the service rendered by the Society to the nation in the domain of the science and practice of agriculture, the Royal (Dick) Veterinary College regard more particularly help and inspiration extended to veterinary science. In their address presented to the directors this week the College authorities say that if it is but seemly to hold in grateful recollection the stimulating and sustaining encouragement given by the Highland Society at Edinburgh to William Dick, when, in 1823, he determined to bring the teaching of veterinary science north of the Border, it is no less becoming to acknowledge gratefully the extended patronage and aid the Highland Society's successor has bestowed upon the College of which William Dick was the founder."

Pit Ponies at the "International."

A novel feature of the International Horse Show, which will open at Olympia on June 20th and continue till June 27th, will be a parade of 60 pit ponies from South Wales. A special feature with a popular appeal is now looked upon as a necessary item of the daily programme

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of obedience and decent behaviour are implanted in their youth. Since Alsatian breeders started their obedience tests the public has learned to appreciate the possibilities in training, and one is glad to see that the movement is extending. In one of the obedience classes at the Ladies' Kennel Association show last week were Labradors, golden retrievers, Clumber and cocker spaniels, Irish setters, Great Danes, Airedales, sheepdogs, and even Pekingese. Such a comprehensive collection has never before entered the ring at one time, and it is significant that shows should now be concerned with more than beauty tests."

of the show. It will be recalled that last year the presence at Olympia of a detachment of the Royal Canadian Mounted Police attracted many visitors and greatly heightened the spectacular side of the exhibition.

It seems fitting that the hard-working pit pony, whose numbers must have greatly decreased with the increasing use of electrically-driven haulage, should be represented at London's great horse show, and no doubt many visitors will be surprised to see that the pit pony is of considerable weight, girth, and sturdiness. The animals chosen for exhibition average 14 to 15 hands high. Pit ponies are reputed to be long-lived, and several veterans still working daily in the pits will be included among those to be exhibited, in order to demonstrate that after 10 or 20 years of work underground they can be as full of life and vigour as many half their age engaged on surface work.

Medal for "Agricultural Research."

The Council of the Royal Agriculture Society of England desire to call attention to the offer by the Society of a Medal for Original Agricultural Research, the Regulations governing which are as follows:—

(1) The Medal shall be called the Royal Agricultural Society of England's Research Medal. The Medal will be of Silver, and money or books to the value of Ten Pounds will be added.

(2) The Medal shall be awarded for a Monograph or Essay giving evidence of original research on the part of the candidate on any agricultural subject, on any of the cognate agricultural sciences or on agricultural economics. It must be signed by the candidate as the genuine work of the candidate himself.

(3) Candidates for the Medal must reside in Great Britain or Ireland, and must not be more than thirty years of age on September 29th, 1931.

(4) The Medal shall be adjudged by referees appointed by the Council of the Royal Agricultural Society.

(5) The Monograph or Essay shall be forwarded to the Secretary of the Royal Agricultural Society *on or before October 31st*, 1931. The Monograph or Essay shall be typewritten or printed.

(6) If, in the opinion of the Referees, no Monograph or Essay be found to attain a sufficient standard of excellence, they shall be at liberty to reserve the Medal of that year for award as an additional Medal in some subsequent year.

(7) The Monograph or Essay of the successful candidate shall be published in the *Journal of the Royal Agricultural Society*, if, in the opinion of the Council, it is suitable for that purpose. Essays already published shall not be eligible for the Medal.

H.M. Stationery Office Publications.

The under-mentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses:—London: Adastral House, Kingsway, W.C.2, and 28, Abingdon Street, S.W.1; Cardiff: 1, St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120, George Street.

	Price Net. *s. d.*	*Post Free.* *s. d.*
Agriculture and Fisheries, Ministry of:—		
Dairy Cattle, Register of:—		
Vol. xiv.		
(1) Milk-Recorded Cows in respect of which Certificates of Merit have been awarded		
(2) Pedigree Bulls: (*a*) Whose dams and sires' dams have given the standard yield for their breed. (*b*) With two or more daughters which have given the standard yield for their breed (24-22-14-0) ...	0 6	0 8
House of Commons Bills:—		
150.—Proprietary Medicines. To regulate the manufacture, sale, and advertisement of certain medicines and surgical appliances; and for purposes connected therewith	0 3	0 3½

Correspondence.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue. All correspondence must bear the name and address of the contributor for publication

The Editor does not hold himself responsible for the opinions of his correspondents.

Dosage of Collosol Manganese.

To the Editor of The Veterinary Record.

Sir,—The letter of Mr. George Dykes in your issue of the 9th, in connection with the use of collosol manganese, draws attention to a point which we have always emphasised, *viz.*, the importance of dosage.

Mr. Dykes rightly draws attention to the work of Walbum in explanation of the *rationale* of the action of manganese, and the reason for the necessity of avoiding an overdose.

The quotation from Walbum that "by some means injections of manganese raised the power of the body, to form antibodies," is of great interest, and one to which attention has previously been drawn by Madsen (*New State J. of Med* Ap., 1923).

McHargue (*Ind. and Eng. Chem.*, 18, 1926, 172) showed that plants in the absence of manganese fail to synthesise chlorophyll and became chlorotic. In an earlier work (*J. Agr. Res.*, 27, 1924, 401) the same writer suggests that manganese may be the vital factor removed in milling of seeds. The metal occurs in greatest quantities in those organs of the animal body (such as the liver, kidneys and pancreas) which are richest in vitamins.

The dosage of manganese is brought to a more exact basis by the work of McCarrison (*Indian Journal of Med. Res.*, 1927, 14, 641). He found that 0·889 mg. of manganese daily retarded the growth of young rats, whilst 0·0327 mg. increased the rate of growth.

Finally, Skinner, Peterson and Steenbock (*J. Biol. Chem.*, 90, January, 1931, 65) showed that additions of copper and iron, either singly or together, decreased the retention of manganese.

In Mr. Spicer's article it will be noted that he never recommends a higher dose than 7 c.c. of collosol manganese (= 17·5 milligrammes of manganese) the commencing dose usually being about 3 c.c. The 7 c.c. dose is well within the limits recommended by McCarrison, and so long as the above dosage is carefully adhered to, unlooked-for results are not likely to occur.

In the event of a long series of injections being given, or a negative phase developing, the work of Steenbock and his colleagues suggests a series of ferro-cuprum injections.

I am,
Yours faithfully,
for the Crookes Laboratories,
J. F. Ward,
Chief Chemist.

The Crookes Laboratories,
Gorst Road,
Park Royal,
London, N.W.10.

May 13th, 1931.

The Editor acknowledges the receipt of the following:—

Communications from Dr. H. P. Bayon (Cambridge), Mr. Harvey S. Purchase (Cambridge) and Lieut.-Colonel T. D. Young (London).